

Name Index

- African Union (AU) Agenda, 187
 Alaska ice sheet, 62
 Amazon Rainforest, 18, 24–5
 Antarctic Bottom Water (AABW), 163, 165–8, 170
 Antarctic Circumpolar Current (ACC), 169
 Antarctic snow accumulation, 97
 Antarctica ice sheets, 144, 146–8
 Arctic glaciers, 77
 Asia Science, Technology and Academic Advisory Group (ASTAAG), 404
 Asian Green Belt, 388, 390–1
- Bølling-Allerød (BA) warm period, 165
- Canada's Hydro-Quebec power grid, 33
 Carrington event, 33–4
 Catastrophic changes, 271
 Climate Model Intercomparison Project (CMIP5), 16, 102
 Conference of Parties (COP), 3, 19, 187
 Coronal Mass Ejection (CME), 29, 32, 34, 47–8
 Cryospheric processes, 91
- Dansgaard-Oeschger (D-O) warm events, 161–2
 Doha Amendment, 3
- Earth Observing System (EOS), 316–17
 Eddy period, 35
 European Space Agency (ESA), 29–30, 50, 64, 104, 146, 149, 327
 European Union, 4, 34, 146
- Food and Agricultural Organization (FAO), 199, 202, 205, 211, 213–14, 239, 275–6, 280–1, 283, 288, 296, 301, 304, 313–14, 382
 Forbush decreases (FD), 37
 Framework Convention on Climate Change (UNFCCC), 3–4, 13, 17, 19, 25, 400, 402
 Future Earth, xii, 7–8, 12–13, 40, 52, 91, 100, 114–15, 117–19, 121–2, 128–9, 179, 185, 403–7
- Galactic Cosmic Rays (GCR), 33, 35–6, 48–9
 Gaussian smoothing, 78–80
 Gleissberg period, 35
 Global Climate Models (GCMs), 23, 102–3, 314, 319, 324
 Global Navigations Satellite Systems (GNSS), 84
 Global Positioning System (GPS), 32, 62, 72–3, 79, 81, 94–5, 104, 262, 316–17
 Green Climate fund, 190, 402
 Greenland and Antarctica ice sheets, 144, 146–8
 Greenland ice sheet (GIS), 24, 73, 77, 79, 91–2, 94, 96, 99–101, 115, 117, 168
- Hadley cell, 41
 Haiti earthquake, 314, 358
 Heinrich cold events, 161–2
- Helsinki Commission (HELCOM), 383
 Himalayan glacier, 18, 22, 25
 Himalaya-Tibetan Plateau (HTP), 388, 395
 Hurricane Katrina, 272, 314
 Hurricane Sandy, 272, 314
 Hurricane Wilma, 314
 Hyogo Framework, 349, 399–400, 406
- Indian Ocean tsunami, 314
 Integrated Research on Disaster Risk (IRDR), 13, 359, 399, 403–5
 Intergovernmental Panel on Climate Change (IPCC), 4–6, 12, 15–16, 18, 20, 22–5, 96, 99–102, 144, 148–9, 152, 169, 240, 278, 302, 337, 386, 389, 398, 403
 International Centres of Excellence (ICoE), 403
 International Council for Science (ICSU), xi–xii, 6–8, 10, 13, 117, 121, 129, 268, 325, 384–5, 387, 400, 403–4, 406
 International Food Policy Research Institute (IFPRI), 201–3, 208, 213, 217, 289
 International Geographical Union (IGU), 8, 117
 International Geosphere Biosphere Programme (IGBP), 7–8, 28, 404
 International Human Dimensions Programme on Global Environmental Change (IHDP), 7–8, 404
 International Maritime Organization (IMO), 382
 International Seabed Authority (ISA), 301, 382
 International Social Science Council (ISSC), 6, 13, 117, 400, 403–4
 International Union of Geodesy and Geophysics (IUGG), ix, 7, 8
 International Union of Nutrition Sciences (IUNS), xii, 211
- Japan Aerospace Exploration Agency (JAXA), 50, 66
 Johannesburg Declaration, 400
 Johannesburg Sustainable Development Summit, 399
- Kyoto Protocol, 3–4, 25
- Laurentian Ice Sheet (LIS), 161, 164, 168
 London Convention, 381
 London Protocol, 381
- Marine Protected Areas (MPAs), 382, 384
 McGill Paleoclimate Model, 164
 Milankovitch cycle, 15–16
 Milankovitch global cooling, 164
 Millennium Development Goals (MDGs), 9, 57, 201, 213, 384, 399–400
 Montreal Protocol, 4, 337
- NASA Solar Terrestrial Relations Observatory (STEREO), 34, 383
 Nobel Peace Prize, 6
- Oslo-Paris Convention (OSPAR), 383
- Paris Agreement, 4–6, 9, 25, 187, 189–91, 400
 Pinatubo eruption, 314
- Regional Fisheries Management Organizations, 382
 Risk Interpretation and Action (RIA project), 404
- Schwabe period, 35
 Sendai Framework, 6, 11, 13, 116, 359–60, 400, 402–3, 405
 Sumatra earthquake, 314
 Sustainable Development (SDG), 6, 8–11, 13, 20, 22, 117–18, 121–2, 183, 185, 188–90, 199, 201–2, 207, 213, 360, 384–5, 387, 400, 405
 Sverdrup flow, 161
- Tohoku earthquake and tsunami, 314, 358
 Tuvalu-New Zealand Agreement, 19
- UN Conference on Sustainable Development, 268
 UN Millennium Declaration, 201
 UN Sustainable Development (SD) Summit, 202
 United Nations (UN), 3–4, 6–7, 9, 11–12, 57, 118, 121, 197–9, 201, 204–5, 207, 211, 213–14, 216–17, 268–9, 272–3, 276, 314, 330, 341, 359, 381–2, 384–6, 398–400, 403–6
 United Nations Convention of the Law of the Sea (UNCLOS), 382
 United Nations Development Program (UNDP), 217, 366, 399, 403
 United Nations Educational, Scientific and Cultural Organization (UNESCO), 7, 386
 United Nations Environment Programme (UNEP), 4, 187, 189, 243, 398
 United Nations General Assembly, 201, 384, 398–400
 United Nations High Commissioner for Refugees (UNHCR), 19
 United Nations International Strategy for Disaster Reduction (UNISDR), 399, 403, 406
- Vienna Convention, 4
- Water Framework Directive (WFD), 126–7
 World Health Assembly, 204
 World Health Organization (WHO), 25, 121–4, 128, 201–2, 211–12, 214, 239, 299, 393
 World Humanitarian Summit, 400
 World Meteorological Organization (WMO), 4, 7, 25, 398, 404
 World Ocean Assessment, 386
 Younger Dryas (YD), 165–6

Subject Index

- 50-to 70-year quasi-periodic cycle, 133, 140
 abnormal physiological condition, 201
 access to resources, 201
 acid rains, 206
 acidification, 16, 18, 24–5, 126, 241, 280,
 290–2, 294, 297–9, 305–8, 380–1, 383
 adaptation, 240
 adequacy, 201
 adequate nutrition, 201
 adult diabetes, 204
 adult overweight, 204
 Africa, 198–9, 204, 206–8
 Africa-Asia multidecadal teleconnection
 pattern, 133
 age, 197–8, 202, 204, 207
 Agreement
 Paris, 4–6, 189–90
 agricultural fertilizers, 206
 agriculture, 190, 240, 365, 391
 added-value, 261
 breeds, 241
 climate smart agriculture (CSA), 241
 fertiliser, 240
 financing, 241
 innovation, 242
 nuclear winter, 328
 production, 335
 transformation, 188
 air–sea exchange. *See* ocean–atmosphere
 interaction
 Akosombo Dam of Ghana, 206
 altered food consumption, 200
 altimetry, 64, 68–9, 76, 86, 94, 97, 104, 107,
 109, 113, 145–7, 149–55, 157, 160
 amenities, 197
 anaemia of women, 204
 animal source foods, 205
 animals, 200, 206
 Anthropocene, 7, 13, 70, 114–15, 118–20, 179,
 185, 209, 219, 305–6, 310, 386, 388, 397
 antibiotic resistance, 215
 anti-pollution policies, 206
 aquaculture, 280, 291, 296–9, 301–2, 304–10,
 365, 391
 polyunsaturated fatty acids, 287–8, 296
 arsenic, 121, 123
 Asia, 198–9, 204
 Atlanta, Georgia, United States, 200
 Atlantic Meridional Overturning Circulation
 (AMOC), 133–4, 136–8, 140, 165
 Atlantic Multidecadal Oscillation (AMO),
 133–8, 140
 atmospheric gases, 206
 Atmospheric General Circulation Model
 (AGCM), 134, 136
 available resources, 197
 balance of nature, 206–7
 bees, 206
 big cities, 200
 biodiversity, 240, 299, 390
 biofuel, 205, 212, 250, 257–8, 265, 283, 290,
 304
 biomass, 207, 215, 247, 258–9, 266, 278, 287,
 293, 298, 302–3, 308, 373, 381, 390
 birds, 206
 births, 197
 bivalve mollusks, 206
 blood glucose, 204
 Brazil, 202
 burden of disease, 202
 burgeoning population, 205
 butterflies, 206
 calcareous biota, 206
 calcified marine biota, 206
 caloric requirement, 199
 capacity building, 191, 241, 322, 324, 362
 carbon dioxide, xv, 12, 15, 24, 40, 42–4, 51,
 131, 153, 160, 206, 223, 247, 250, 290,
 292–5, 351, 375, 379–80
 carbonic acid, 206
 care, 201–2, 205
 Caribbean, 198–9
 cars, 206
 cattle, 206
 cereal, 250
 barley, 277–8, 285, 291, 294
 maize, 12, 14, 21, 240–1, 244, 256, 277–8,
 282–3, 287, 290–1, 294, 326, 334–5, 340
 residues, 257
 rice, 21, 70, 184–5, 240–1, 244, 275, 277–8,
 280, 283, 285–8, 290, 292, 294, 301,
 334–5, 340, 389, 395
 wheat, 277
 Chicago, 200, 208
 child nutritional status, 204
 childhood, 201
 children under five, 204
 China, 198
 circulation, 159
 Atlantic Meridional Overturning
 Circulation (AMOC), 161, 165
 thermohaline, 161
 climate
 change, 3, 22, 240
 scenarios, 16
 system, 131, 134, 140
 variability, 132–3
 clouds, 36
 Community Climate System Model
 (CCSM4), 134–6, 139–40
 community safety networks,
 200
 composition, 197
 comprehensive plans, 197
 concurrent changes, 197
 continental shelf, 382
 coping mechanism, 200
 corals, 206
 cosmic rays, 33, 35
 crisis mitigation, 197
 crop
 losses, 334
 yield, 247, 278
 cryosphere, 91
 permafrost, 24
 dams, 206
 Dar es Salaam, 197
 deaths, 197
 decadal, 132–3, 136, 139–40
 decadal climate variability, 132
 decadal coupled mode, 139–40
 decadal coupled ocean–atmosphere
 interaction, 131–3, 140
 decadal prediction, 132
 declarations, 201
 deficiencies, 201–2
 definitions of terminologies, 199
 delayed negative feedback, 138
 density, 197
 deoxygenation, 297–8
 Department of Economic and Social Affairs,
 198, 208
 desalination, 373
 determinant of health, 197
 developing countries, 197, 208
 dietary changes, 205
 dietary habits, 197
 direct healthcare costs, 202
 disaster, 116, 284, 358
 response, 342
 risk, 398
 risk reduction, 6, 13, 117, 322, 327, 348–50,
 355, 359, 363, 389, 399–400, 402–3,
 406
 disease, 394
 marine, 299
 diseases
 crop, 281
 diverse diet, 205
 diversity of choices, 205
 dodo bird of Mauritius (*Raphus cucullatus*),
 206
 domestic sewage, 206
 drought, 11, 16, 18–20, 22, 24–6, 63, 71,
 75, 197, 212, 240–1, 244–5, 271, 277,
 281–2, 285–8, 290–1, 294, 315,
 317–18, 320, 323–7, 335, 340, 360, 393,
 401–2
 Earth's balance of nature, 207
 Earth's biodiversity heritage, 206
 earthquake, 351, 356
 East Asian summer monsoon, 133
 East Asian winter monsoon, 133
 ecological footprint, 9, 183, 304
 economic growth, 197
 ecosystem, 211, 298
 based adaptation, 188
 health disorder, 212
 services, 379, 392

- ecosystems, 391
 eddy period, 35
 education, 201, 205, 264
 educational development, 197
 effluents, 206
 El Niño–Southern Oscillation (ENSO), *See* ENSO
 Elevated Highway Farm, 200, 208
 emigrate, 197
 empirical orthogonal function (EOF), 132–4
 endocrine disruptors, 212, 215–16, 218
 energy
 geothermal, 364–74
 renewable, 188, 190, 366
 solar, 11
 wind, 367
 energy intense foods, 197
 ENSO, 131, 143–4, 146, 149, 152, 314, 318, 320, 322, 325–7
 environment, 197, 205
 environmental
 damage, 197
 stress, 287
 environmental effects of urbanization, 205
 Europe, 198–9, 206
 eutrophication, 127, 240, 297–8, 381
 evaporation, 15, 52, 60–1, 67, 72, 159, 169, 255, 373, 379–80
 excesses, 201
 exclusive breastfeeding, 204
 exclusive economic zone (EEZ), 382
 exposure, 355
 extinct, 206
 extreme events, 11, 18–20, 22–3, 25, 27, 33, 64, 116, 152, 242, 281–2, 292, 294, 314, 320–1, 352, 360–1, 382, 385, 389, 401, *See* IPCC SREX
 fatty acid, 287
 fertility rates, 198
 fish, 200
 fisheries, 20, 185, 240, 244, 280, 290–1, 296–8, 301–6, 308–10, 313, 316, 380, 382, 384, 386, 396
 fishing and water navigation activities., 206
 floods, 63, 319, 341–7, 389
 food, 11, 187, 197, 199–201, 205, 207
 access, 282
 chain, 254
 composition, 250
 contamination, 256, 282
 delivery, 284
 dietary guidelines, 214
 distribution, 12
 diversity, 216
 engineering, 247, 263
 loss, 187, 253, 328
 packaging, 215, 251
 packing, 262
 preparation, 205, 249, 251, 263
 production, 12, 240, 250, 275, 279, 296
 productivity, 247
 quality, 285
 safety, 215
 security, xii, 6–7, 11–13, 16, 18–20, 22, 25, 119, 121–2, 186–93, 199, 207, 209, 212, 216, 218–21, 239–41, 243–6, 265, 269, 273–4, 276, 280–1, 283–4, 290–4, 296, 298, 301–2, 304–5, 307, 313–14, 321, 324, 326–7, 358, 379, 387, 401
 storage, 255, 261
 supply chain, 268, 301
 waste, 215, 251
 webs, 303
 food and nutrition security, 199, 247–67
 foresight, 241
 framework
 climate services, 13
 Framework
 Sendai, 6
 fruit trees, 200
 fruits and vegetables, 205
 future cities, 197
 Future Earth, xii, 7–8, 12–13, 15, 91, 100, 104, 114–15, 117–19, 121–2, 128–9, 144, 179, 185, 197, 206, 268–71, 273–4, 296, 364, 370, 379, 385–6, 388, 394, 396–7, 399, 403–8
 future growth and sustainability, 197
 gender, 114, 188, 197, 199, 217, 223, 242–3, 245, 304, 309, 387, 401
 gender analysis, 242
 general circulation model, 134
 geodesy, 72–84, 95
 gravity, 74, 95
 shape of the Earth, 72
 geography, 114, 118
 geophysical methods, 316
 Ghana, 202, 206
 GIS (geographical information systems), 115, 117, 168, 327
 glacier, 22, 144, 148
 acceleration, 97
 cycles, 390
 isostatic adjustment, 103–4, 145
 monitoring, 98
 Gleissberg period, 35
 global, 197–202, 204–5
 global agenda for SD, 202
 global commitment to nutrition, 201
 global gross domestic product (GDP), 202
 global integration, 399
 global mean surface temperature (GMT), 131–2
 Global Nutrition Report 2015, 202
 Global Nutrition Situation, 200
 global nutrition targets, 202
 global population, 197–8, 204
 global population size, 197
 global warming, 4, 6, 15, 23–4, 35–6, 83–6, 99, 109–10, 131–2, 140–1, 143, 148, 153–4, 156, 159, 180, 185–7, 212, 217, 219, 277, 290, 293–4, 296, 306, 321, 326, 370–1, 376, 379–81, 389
 global warming hiatus, 36, 131–2, 139–40
 governance, 398, 405
 GRACE satellite, 62–3, 65, 69–71, 73, 76–80, 83–7, 97, 99, 104, 106–12, 148–50, 153–4, 157–8, 180, 185–6
 green
 climate fund, 190
 revolution, 11
 Green Belt, 390–1
 greenhouse effect
 Mars, 43
 Titan, 46
 Venus, 42
 greenhouse gases, 12, 15–17, 24, 43, 72, 91, 100, 103, 131–2, 144, 159, 161, 166, 206, 261, 265, 273, 318, 392
 Hadley cell, 41
 Hasselmann climate model, 140
 hazards, 11, 37, 91, 98, 115–16, 120, 123, 127, 223, 281, 291, 313, 315, 321, 324–5, 327, 349–50, 352–3, 355–6, 358, 360, 363, 381, 400, 402, 405–8
 health, 7, 9, 13, 16, 18, 25, 71, 116, 121–9, 187, 189, 197, 199–202, 205–6, 209–25, 227–30, 232, 234–5, 240, 253, 256, 260, 264–5, 268–70, 273, 275–6, 279, 285, 287–8, 290, 292, 294–5, 298–300, 307, 310, 320, 322, 324, 333, 341, 344, 349, 358, 383, 386, 388–9, 392–4, 396, 400–1
 respiratory, 225
 higher salary or wage, 201
 highly refined foods, 197
 hindcast, 140
 horticultural crops, 200
 Hot Dry Rock, 367
 hydrology. *See* water
 ice, 15–16, 18, 22, 24, 28, 30, 35–6, 43, 45, 51, 62, 65, 70, 72–5, 77–9, 81, 83–7, 91–5, 97–101, 103–12, 144, 146–59, 161–2, 164–8, 172–5, 179, 209, 280, 297, 299, 317, 333, 341–8, 355, 371, 380–2, 389
 sea, 144
 sheet, 95, 149, 167–8
 sheet discharge, 164
 ill health, 200
 imbalances in energy, 201
 immigrating populations, 197
 inaccessibility to adequate food, 199
 income, 199–200, 205
 income poverty, 200
 India, 198, 202, 205, 208
 industrial effluents, 206
 industrial plants, 206
 industrial processing plants, 206
 industrialized cities, 206
 infectious diseases, 200
 influx, 197, 205
 informal trade, 200
 informality, 200
 infrastructure, 197, 205
 input–output, 95
 insurance, 242, 356
 Integrated Research on Disaster Risk, 403
 interdecadal, 132, 140
 Interdecadal Pacific Oscillation, 131
 internal natural climate variabilities, 131
 International Food Policy Research Institute (IFPRI), 201–3, 208
 inundation, 197
 IPCC, 4–6, 15
 AR4, 23, 99, 102–3, 152
 AR5, xv, 15–16, 22, 25, 96–7, 99–103, 144, 148–50, 152, 240
 modelling (CMIP), 102
 projections, 20, 100
 scenarios, 101

Subject Index

413

- Special Reports, 6
 SRES, 103
 SREX, 6, 23
 SRREN, 6
 IYGU, 117, 119
- KAN (Knowledge-Action Network), xv, 8, 386–7
- laborious working conditions, 205
 lack of land, 200
 lakes, 206
 land surface air temperature (LSAT), 133
 landslides, 351
 Latin America, 198–9, 206
 lava flow, 354
 livelihoods, 200, 207
 logistics, 272
- macronutrient, 287
 malnutrition, 199–203, 205, 207–8, 239, 275, 284, 288, 295–6, 301
 Malthus, 11
 Manifesto
 Budapest, 360
 marine protected areas, 382
 Mars, 40
 meat, 197
 megachanges, 18
 megacities, 205
 methane, 206
 micronutrients, 199, 216, 239, 276, 281, 288, 296
 migrate, 197
 migration, 19–20, 22, 61, 91, 100, 105, 110, 198, 216, 255, 280, 282, 314, 318, 320, 326
 Milankovitch, 15, 164
 Millennium Development Goals (MDGs), 201
 mineral nutrients, 206
 modelling and models, 303, 352, 386
 models, 102
 monsoon, 388
 mortality rates, 198
 multidecadal, 131–8, 140
 multidecadal variability, 131–5, 138, 140
 multilevel elevated urban farm, 200
 multipronged approach, 200
 mushrooms, 200, 207
- NAO, 144
 NAO decadal weakening, 132, 140
 NAO forcing, 136, 138
 NAO multidecadal weakening, 140
 NAO-based linear model, 140
 national economy, 201
 NAT-NAO-AMOC-AMO (NNAA), 134–5, 139–40
 NAT-NAO-AMOC-AMO (NNAA) decadal coupled mode, 139
 negative feedback, 135, 138–9
 Net-Reproduction Rate (NRR), 198
 nitrate, 121, 126–7, 182–3, 185–6, 298
 nitrogen, 127, 182, 240
 oxides of nitrogen, 225, 227–8, 231, 275, 392, 396
 non-food production, 200
 North Atlantic, 132–3, 135–8, 140
 North Atlantic Ocean, 138–40
 North Atlantic Oscillation (NAO), 131–8, 140
 North Atlantic SST tripole (NAT), 8, 133, 135–6, 138, 140
 Northern America, 198
 Northern Hemisphere mean SAT (NHT), 131, 133, 140
 novel value-added products, 206
 nuclear
 collateral damage, 332
 smoke, 333
 weapons, 328
 winter, 46, 328, 337–8
 nutrition, 11, 122, 188, 197, 199–202, 205, 207–9, 211, 213–18, 220–2, 243, 245, 264–5, 268–9, 274–6, 278, 281–2, 288, 290–3, 307, 314, 322, 361, 379, 387, 401, *See also* malnutrition and undernutrition
 equity, 216
 ethics, 217
 policy, 213
 science, 211
 nutritional status in children, 200
 nutritious foods, 200
- obese, 202, 205
 obesity, 197, 201, 204–5
 ocean, 379–86
 circulation, 159, 161
 currents, 159
 policy, 386
 pollution, 380–1
 transport, 159
 ocean trenches, 350
 ocean–atmosphere interaction, 131–3, 140
 Oceania, 198
 oceanic advection process, 138
 open spaces, 200
 optimal physical and mental development, 201
 ornamental plants, 200, 206
 osmosis, 255
 overnutrition, 201, 207
 overturning heat transport (OHT), 138
 overweight, 201–5
- paleoclimate, 44, 161
 pangs of climate change, 205
 Panta Rhei, 58
 PDO, 144
 peri-urban agriculture (UPA), 199
 peri-urban environments., 197
 peri-urban floods, 197
 Peru, 202
 pesticide, 121, 124–6, 129–30
 pests, 281
 phosphorus, 240
 plastic litter, 215, 298, 381
 plate tectonics, 350
 Venus, 42
 policy, 242
 pollution
 air, 223, 392
 groundwater, 182
 noise, 299
 ocean, 297–8, 380–1
 poor harvests, 199
 poor weather, 199
 population, 179, 356, 392
 Population Division, 198, 208
 population dynamics, 207
 population size, 197
 positive feedback, 136
 potable water, 200
 poultry, 200
 poverty, 197, 199, 201
 power lines, 200
 power plants, 225, 230, 364–8, 370, 372–3, 392
 precipitation, 16–17, 20, 22, 26, 35, 46, 48–50, 57, 60–2, 65–7, 69, 72, 91, 100, 102–3, 143, 149, 159, 164, 169, 180, 277, 279, 281–2, 298, 314, 317–18, 320, 322, 325, 327, 334, 337, 370, 389–91, 395
 prevalence, 204–5
 primary productivity, 10
 Principal Oscillation Pattern (POP), 134–5, 139
 processed foods, 205
 productive force of society, 198
 productivity., 202
 protein, 199, 201, 218, 222, 257–61, 266, 281, 286–8, 290–1, 293–4, 296, 301, 380
 Protocol
 Kyoto, 4
 Montreal, 4
- quality of life, 199
- refrigeration, 256
 regional trends, 197
 remote sensing, 45, 60–1, 67, 69, 71, 95, 99, 115, 117, 148–9, 154, 235, 316, 327
 residential dwellings, 206
 resilience, 11, 179, 185, 188–9, 191, 213, 217, 241, 268, 278, 281, 295, 313, 322, 324, 359–61, 381–2, 389, 399–402, 408
 risk, 355
 assessment, 6, 121–4, 127–30, 324, 342, 349, 353, 356, 360–1
 disaster risk, 116
 management, 11, 123, 127–8, 327, 345, 348, 356, 359–60, 385, 389, 398, 400, 402–3, 405, 407
 reduction, 342
 riverbanks., 200
 rivers, 206
 roadsides, 200
 Rome Declaration, 202
 Rossby wave, 133
 rural, 197–200, 204–5, 208
 rural children, 205
 rural populations, 197, 199
 rural/urban differentials, 204
 rural–urban food supply system, 197
 rural–urban supply chain, 200
- salinisation, 284
 salinization, 20, 153, 180, 182, 294
 saltwater intrusion, 182
 sanitation, 200–1, 205
 satellite, 61, 76, 145, 313, 316
 school performance, 201
 Schwabe period, 35
 scientific unions, 7
 SDG, 6, 9–10
 cities, 11
 climate change, 11

- SDG (cont.)
 hunger, 11, 20
 poverty, 11, 20
 water, 22
 SDG (sustainable development goals), xv, 14,
 117, 119, 121, 188–9, 201–2, 350, 360,
 384–5, 387, 400
 water, 122
 sea, 197, 206
 sea level, 3, 16, 18–19, 22–5, 36, 64, 72, 75, 77,
 79, 83–6, 91–5, 98–101, 104–11, 132,
 144–58, 164, 166, 173–4, 209, 219, 240,
 284, 297, 314, 337, 351, 388, 390, 392
 sea level pressure (SLP), 132, 134–6
 sea surface temperature (SST), 131, 133–7,
 139–40
 seafood, 123, 210, 215, 280, 282, 288, 296,
 298–302, 304–5, 309, 379–80
 seasonal river flooding, 197
 security 132
 national, 21, 349
 nutrition, 275
 see-saw, 132
 Self-Assured Destruction, 332
 Sendai
 Framework, 6, 11–12, 116, 120, 359–60,
 363, 400, 402–3, 405, 409
 sewage, 206
 shelter, 197
 Simplified Parameterizations, primitiveE-
 Equation DYnamics (SPEEDY) model,
 134, 136
 slums, 200
 small to medium size cities, 205
 social services, 197
 social-cultural factors, 201
 socioeconomic activities, 206
 soil moisture, 64
 solar
 activity, 29, 41
 climate relationship, 35
 drying, 253
 energy, 11
 magnetic field, 29
 photo-voltaic, 366
 radiation, 36, 328
 solid wastes, 206
 spatial analysis, 232
 spatial distribution, 197
Spirulina, 200
 squalid conditions, 200
 State of Maharashtra, 202
 storm tracks, 132, 136
 stunted, 202
 stunting, 201, 203–4
 subsurface warming, 180
 sulphur dioxide, 206
 supply chain, 268–74
 supportive infrastructure, 205
 surface air temperature (SAT), 131, 133
 sustainability, xiii, 4, 9–11, 13, 22, 117, 119,
 121–2, 183, 188, 192, 199, 207, 213, 245,
 268, 349–50, 359–60, 383–4, 386, 388,
 398–400, 402, 404–7
 Sustainable Development Goals, *See* SDG
 (sustainable development goals)
 sustainable urban, 200
 Tanzania, 197
 temperature
 sea surface, 131–3, 141–3, 164, 170
 Titan, 40, 45
 traditional family structure, 200
 transparency, 405
 tree lichens, 206
 tsunamis, 116, 179, 314, 349–52, 358–9, 363
 UN, 198, 201, 204–5, 208, 330
 FAO, xv, 191, 199, 202, 205, 207–8, 211,
 213–14, 218, 239, 241, 244, 266, 268,
 274–5, 279–81, 283, 287–8, 290–2, 295–6,
 301–2, 304, 306–7, 313–14, 316, 322,
 324–5, 380, 382, 387, 391, 395
 HCR, 19
 UNCLOS, 382
 UNEP, 4, 382, 398
 UNFCCC, 4
 WHO, xvi, 25, 121–4, 128, 130, 202, 207,
 212, 214, 222, 239, 246, 295, 393
 UN Millennium Declaration, 201
 UN Sustainable Development (SD) Summit,
 202
 undernourished, 202
 undernourishment, 251
 undernutrition, 201–2
 underweight, 201, 204–5
 unemployment, 200
 United Nations, *See* UN
 unwanted noxious weed, 206
 urban agriculture, 199–200, 208
 urban areas, 197–200, 205
 urban centres, 197, 200, 204–6
 urban children, 204, 208
 urban environments, 197, 199
 urban fringes, 197
 urban populations, 197, 205
 urban slum areas, 205
 urbanization, 179, 197, 204–5, 207, 251
 urbanization and climate change, 206
 variety, 200–1
 vegetable, 125, 200, 217, 220, 256, 258, 262,
 266, 277, 291, 293
 vegetable gardening, 200
 vehicles, 228
 Venus, 40–1
 verge of extinction, 206
 volcanic ash, 351
 volcano, 42, 45
 volcanoes, 350
 vulnerability, xi, 3, 11–12, 37, 123, 179, 183,
 246, 283, 292–5, 313–14, 319, 323–4,
 341–2, 346–7, 349–50, 355–6, 358–60,
 382, 388–9, 400–1
 warming hiatus, *See* global warming hiatus
 wasting, 201, 204
 water, 201, 205–8
 balance, 57, 60
 cycle, 57, 63, 179
 drinking water, 124
 groundwater, 12, 20, 22, 25, 57, 60, 63, 70, 73,
 75, 79, 85–6, 127, 152, 156, 158, 179–80,
 182–6, 268–74, 315–17, 371, 375, 391, 397
 Mars, 43
 modelling, 61, 180
 monitoring, 60–1
 river, 63, 341
 security, 121, 390
 storage, 63, 149
 surface, 22
 surface water, 127
 water hyacinth hydrophyte
 (*Eichhorniacrassipes*), 206
 WCRP, xvi, 4, 7, 12–13, 385–6, 409
 weather
 planetary, 41
 seasonal forecasts, 242
 space, 28, 40, 47
 Titan, 46
 well being, 197
 wheat, 21, 35, 240–1, 244, 278, 283, 285, 287,
 290–5, 334–5, 340
 women's empowerment, 201
 World Health Assembly, 204
 world population, 197–8, 207
 Zambezi river ecosystem, 206
 Zero Hunger Challenge, 202