

Index

Introductory Note

References such as ‘178–79’ indicate (not necessarily continuous) discussion of a topic across a range of pages. Wherever possible in the case of topics with many references, these have either been divided into sub-topics or only the most significant discussions of the topic are listed. Because the entire work is about ‘commons’, the use of this term (and certain others which occur constantly throughout the book) as an entry point has been minimised. Information will be found under the corresponding detailed topics.

- 2 x 2 games, 66, 69–72, 75–76
- 5G, 13, 310, 313–315
- 2030 District Network, 10, 188–200
 - analysis, 196–199
 - as of February 2020, 191
 - theoretical framework, 192–196
- A’ana, John, 276
- abatement, 68–75, 313
 - mutual, 71, 74
- accountability, 9, 82, 156, 160–163, 199, 238
 - and BIDs (Business Improvement Districts), 160–161
 - definition, 160
 - upward and downward, 227
- accounting, 65, 96, 106–107, 309
- action
 - arenas, 101, 217, 225
 - levels of, 19, 22, 24
 - situations, 19–22, 24, 182–183, 187, 195–196, 198–200, 205–206, 214
 - collective, 2
 - CSO, 182
 - IAD, 10, 176, 182
- active citizenship, 138–140, 148–151
- activists, 4, 96, 167, 173, 176
- actors, 49–50, 128–129, 131–134, 136, 139–140, 161, 182, 222
 - external, 228, 235
 - government, 117, 182, 185
 - leading, 217, 221–223
 - local, 8, 91, 141, 143, 163, 199
 - multiple, 2, 32, 157, 162, 219
 - private, 158, 178–179, 286, 290
 - project, 140, 144, 150–151
- Acupuntura Urbana, 140, 148–150
- adaptation, 40, 105, 147, 221, 256
- administration, 30, 95, 129, 158, 313
 - city, 125, 127, 129–130, 161
- admissions, 13, 251, 285, 289
- adobe bricks, 141, 144
- adults, 141, 143, 146
- advocacy, 95, 98, 174–175, 206, 209
 - organizations, 178
- aesthetics, 119, 261
- affirmative action, 12–13, 284–291
 - lessons learned from, 290–291
 - race-based, 12, 284–285
- affordability, 5, 168–170, 175
- affordable housing, 7, 9, 80, 84–85, 164–165, 167, 169, 173, 175
- Africa, 227, 241
 - South, 227, 234
 - Southern, 11, 226
 - sub-Saharan, 92, 98, 226, 228, 239–241
 - West, 8, 90–99
- Aga Khan Rural Support Programme (AKRSP), 208, 210–211
- agencies, 8, 10, 19, 22, 82, 175, 183–184, 209–212
 - external, 10, 203–205, 213, 215
 - facilitating, 10, 203–206, 208–214
 - government, 10, 45, 184–185, 191–192, 205, 211, 224, 226, 305
 - state, 258, 260–261
- agents, 106, 183, 303
 - of enclosure, 13, 284
 - external, 224, 230
- aggregated harm, 57, 59
- aggregation, 20, 24, 47, 53, 61, 136, 166, 171
 - rules, 21, 183

Agrawal, Arun, 122, 204, 213
agricultural
 lands, 39, 231, 256, 259
 practices, 275–276
 productivity, 57, 297, 305
 runoff, 243, 246
agriculture, 34, 38, 207, 235, 275, 280
aid
 humanitarian, 1, 7–8, 89–91, 94–96, 98–99
 relationship, 8, 90–91, 93–94, 96
 resources, 8, 90–91, 96, 99
air
 clean, 64, 108
 pollution, 30, 64, 119, 277
 quality, 107, 114
AKRSP (Aga Khan Rural Support Programme), 208, 210–211
Alexander Stream, 11, 243, 245–247, 251
alienation, 170–171, 235, 271
allocation, 1, 34, 39, 84, 122, 165, 236, 238
 equitable, 115
 of land, 237
 methodology, 271
 of property rights, 8, 101
alternative ownership structures, 164, 303–304
amenities, 250, 288
American Institute of Architects, 188, 190
American West, 255–256, 262
analytical tools, 9, 18–19, 23, 102
analytics, 53–54
ancestral land, 227, 233
anger, 245, 287
animals, wild 11 *see* wildlife.
animating principles, 12, 264
anti-commons, 284–288, 290–291
 digital, 6, 46
 and gridlock, 285–287
 members, 284–285, 290
 resource directory, 45–54
 tragic, 48–49
antiproperty veto, 290
appropriation, 4, 59, 62–63, 65, 168, 258–261, 268, 296–297
 instream, 260
 prior, 12, 255–262
appropriative rights, 255, 258–260, 262
appropriators, 56–57, 60, 62–64, 257, 262
aquifers, 63, 166, 247, 256, 259
architects, 128, 138–140, 145–146, 148, 152, 188, 190, 257
architectural
 co-design, 140–145
 design, 139, 146
 practice, 140, 143, 145
 spaces, 138–139, 151
architecture, 138–141, 145–147, 151, 190–191, 197
 collaborative, 139–140, 143
 teams, 143–146, 148
 urban commons, 138, 140–143, 146, 151–152
architecture-facilitation teams, 148–151
arid regions/areas, 12, 233, 237, 256
aspirations, 118, 121
assets, 80, 126, 140, 190

 cultural, 127, 129
 NYCHA, 84–85, 87
 public housing, 7, 80–81
 urban, 3, 8–9, 79, 136
associational goods, 178
associations
 Authorized Associations, 232, 236
 informal, 182–183
 local, 98, 180
 resident, 162
assurances, 68, 71–72, 85, 87, 247, 275
asymmetric games, 69–72, 75
Atay, 275, 281–282
attributes, 21, 24, 194, 199, 204–206, 222, 225
 biophysical, 10, 21, 222, 225
 community, 195, 197–198, 200
authority, 51, 160, 163, 230, 234, 236, 239, 276, 279, 314, 316
 customary, 11, 237–239
 traditional, 237–240
Authorized Associations, 232, 236
autonomy, 34, 130–133, 181, 184, 197, 209, 227–228, 235–236, 241

Bahia, 11, 216–225
BAIF Development Research Foundation, 208–209, 211–212
Baltimore, 115, 164–175, 284
banks, 11, 173, 247, 256
Barcelona, 127, 147
barriers, 36, 41, 102, 134, 192
baselines, 56, 190, 195, 197, 258
 energy, 190–191
 national, 191–192
 shifting, 58, 65
beautification, 158–159
Bedouins, 6, 34–42
 metamorphosis, 38–41
behavior, 6, 18, 22, 35–37, 39, 57, 62, 65, 73, 98
 destructive, 22
 social, 35, 37
behavioral contagion, 194, 199–200
beliefs, 27, 223, 238
Bell, Abraham, 284, 286–288, 290
Bella Fuori 3 pact, 132, 136
below-market sales prices, 165, 175
Beltran, Oriol, 17–18, 22–23
beneficiaries, 53, 91, 96–97, 182
 local, 95, 99
benefits, 100–102, 106–107, 192–196, 230–235, 239–241, 244–245, 250–251, 271, 295–296, 298–299
 branding, 193–194, 196, 200
 cash, 233, 235
 community, 84, 244
 direct, 196, 233
 economic, 8, 85, 104, 227, 232, 235
 health, 115, 245
 membership, 193–194
 potential, 13, 84, 86, 167
 private, 193, 271
 public, 105, 261
 shared, 104, 107

- social, 83, 169, 194, 232–234, 236, 239–240
- societal, 102, 121, 258
- Berkes, Fikret, 316
- Berry, Phillip S., 31
- bias, 240
 - racial, 291
 - selection, 200
- Bible, 11, 248
- BID governance, 161–162
- BIDs (Business Improvement Districts), 4, 9, 114, 137, 270
 - and accountability, 160–161
 - evaluation, 157–161
 - relationship to city government, 158–159, 162–163
 - and urban commons, 155–163
 - framework, 161–163
- BIDs (Business Improvement Districts, and representation, 159–160
- Bielefeld, 18–19
- bilateral partnerships, 132, 135–136
- biodiversity, 56, 100, 103, 107, 243, 246, 251
- biophysical
 - attributes/characteristics, 10, 21, 222, 225
 - conditions, 11, 195–197, 200
 - indicators, 211–212
- biotechnology, 12, 273–283
 - critical analysis of regulatory commons, 274–278
- blood ties, 6, 34, 37, 40–42
- Bologna Regulation, 9, 124, 126–132, 135–136, 143
- Boston, 172, 174
- boundaries, 3, 20, 24, 62, 155, 159, 161, 190, 237, 239
 - clear, 52, 90
- boundary rules, 20, 24, 101, 183
- branding benefits, 193–194, 196, 200
- Brazil, 9, 11, 138–139, 141, 145, 151, 216–225
 - Bahia, 11, 216, 218
- breakdown of cooperation, 13, 296, 299, 305–306
- buffer zones, 275, 277
- building energy use, 10, 188–189, 195, 199
 - intensity, 192, 197
- building owners, 10, 188–192, 196–199
 - commercial, 188–189, 191
 - participating, 189, 191, 200
- buildings, 19–20, 126–127, 130–134, 136, 170–171, 190–192, 195, 197
 - city-owned, 129, 135
 - participating, 10, 199
- bureaucratic malfeasance, 95, 99
- burial practices, 95, 99
- Business Improvement Districts 4 *see* BIDs.
- business
 - leaders, 58, 158
 - owners, 158–160, 192
- businesses, 66, 131, 135–136, 155, 158, 160–161, 163, 309, 312–313
 - local, 128–129, 131, 134, 149–150, 155
 - member, 155, 159–160, 162
- buy-in, 90, 93, 97, 172
 - community, 97, 228
 - local, 8, 91, 96
- Buzbee, William, 273–275
- bylaws, 5, 32, 155, 161–162, 169, 171, 183
- California, 2, 102, 180, 256, 311, 315
- Caminhos da Escola, 140, 147–150
 - engagement strategies, 150
- CAMPFIRE (Communal Areas Management Program for Indigenous Resources), 227
- Canada, 52, 188, 244
- canals, 221, 256–257
 - linings, 298, 305–306
- canopy, urban, 106, 113–119, 123
- capability, 42, 138, 151, 268
- capacity, 5, 53, 84–86, 92, 97, 121–122, 175, 265, 270
 - building, 128, 137, 174, 203, 209, 227
 - technical, 90, 95–96
- capital, 5, 47, 88, 97, 100, 107, 183, 258, 268
- carbon, 71, 115, 120, 190
 - fees, 68
 - neutrality, 190
 - sequestration, 103, 119
- case studies, 2, 7, 10, 79, 204, 206, 243, 249, 284–285, 287
- cash benefits, 233, 235
- catalysts, 10, 205, 209–210, 213
- CBC (community-based conservation), 226–230, 232–233, 235–236, 239–241
- CBHPIJ (Peruíbe, Itanhém, and Jucuruçu River Basin Committee), 11, 216, 222–225
- CBWM (community-based wildlife management), 11, 226–241
 - unequal benefits and social conflict, 232–239
- CCP (Communal Conservancy Program), 229, 237
- celestial bodies, 266–267, 270–271
- centralized control, 49, 138, 280
- charities, 285, 287, 289–290
- Chicken, 66–75
- childhood, 141, 148
- children, 9, 30, 65, 114, 134, 141, 143–147, 149–150, 177, 295
- China, 13, 310, 313, 315
- choice rules, 20, 183, 221
- choices, 20–22, 24, 30, 67, 71, 73, 121, 209, 211
- cities, 1, 4, 8–9, 113–118, 123, 135–137, 141, 151–152, 162–163, 188–190, 195–197 *see also* individual cities.
 - as commons, 4
 - as commons reloaded, 124–137
 - geo-political, 166, 168
 - governance, 155–156, 162
 - humane, 151
 - inhabitants, 121, 124–129, 134–136, 161
 - Italy, 8, 126–127
 - mid-sized, 81, 158
 - United States, 167
- citizen enforcement, 274, 276–277
- citizens, 98, 126, 129, 138–139, 141, 147, 150–151, 157, 186, 224
- citizenship, 139, 224
 - active, 138–140, 148–151
- city governments/administrations/councils, 124–125, 127–130, 155, 157–163
- city policies, 126, 160, 162
- city trees, reconceptualizing as unified forest, 117–118
- city-owned buildings, 129, 135

- civic action, 139, 141
- civic engagement, 129, 136–137
- civil liberties, 185
- civil society, 10, 92, 176, 180–186, 216–217
 - definition, 176–179
 - groups, 188, 312
 - organized, 222–224
- civil society organizations (CSOs), 1, 3, 8, 10, 46, 92, 98, 139, 176–179
 - application of Ostromian lens to research, 181–182
 - application of tragedy of the commons, 179–180
 - conceptualization, 179, 182
 - definition, 176–179
 - legal vs. working rules, 185–186
 - operations, 10, 176
 - Ostromian logic applied to, 176–187
 - permissive rules, 184–185
 - regulatory regimes, 182–186
 - restrictive rules, 183–184
 - rules affecting action situations, 183
 - in West Africa, 91–94
- claims, 9, 29, 41, 79, 88, 116, 163, 262, 266–268
- classical liberalism, 27
- clean air, 64, 108
- clients, 45–46, 52, 143–144, 193, 214
- climate, 10, 191, 197, 200, 230, 287
 - change, 7, 64–65, 91–92, 114, 188, 259, 261–262, 316
 - cooperation, 73, 75
 - dilemmas/problems, 7, 66–75
 - negotiations, 66, 68–70, 75
- closing space literature, 182–184, 186–187
- CLT-as-commons, 10, 164–165, 169, 172, 174–175
- CLTs (community land trusts), 9–10, 164–175
 - CLT movement, 166–168
 - as commons institutions, 168–171
 - community not commodity housing, 172–174
 - constructing CLT cultural and knowledge commons in Baltimore, 174–175
 - governing CLT commons, 171–172
 - land, 165, 170–171, 173
 - legal form, 10, 175
 - members, 165, 169, 172, 175
- club
 - goods, 51, 192–193, 315
 - theory, 189, 192–194, 196–200
- clubs, 93, 103, 192–194, 198, 315
- coalitions, 174, 277, 281, 291
- co-cities, 124, 139–141, 143, 151
- co-creation, 9, 140–141, 143–144
- co-design, 140–144, 148
 - architectural, 140–145
 - curricula, 144
 - methodologies, 129, 141
 - processes, 129, 151
 - public spaces, 148–149
 - workshops, 144, 146–147
- coercion, 29, 31–32, 178, 189, 212
- co-governance, 9, 126, 128, 131, 135, 140–141, 145
 - agreements, 148, 150
- cohesion, social, 144, 149, 172, 228
- Cold War, 226, 266
 - Digital, 13, 309–317
- Cole, Daniel, 185
- collaboration, 121–122, 126–127, 130–132, 134, 138–141, 145–146, 151–152
 - multi-sector, 147, 151
 - pacts, 8, 127–132, 143
- collaborative
 - architecture, 139–140, 143
 - economies, 5, 129, 134–136, 143–144
 - governance, 7, 91, 135, 140, 161, 166
 - management, 11, 52, 118, 227
- collective action, 18–19, 22–23, 63–64, 89–90, 92, 127–129, 143–149, 188–189, 203–204, 218
 - dilemmas/problems, 2, 49–50, 90, 94–95, 217–220
 - model, 7, 56, 59, 62, 64–65
 - successful, 21, 62
- collective choice, 221, 223
 - agreements, 219, 222
 - rights, 62
- collective
 - economic units, 9, 124, 128, 136
 - governance, 125, 139, 161, 165, 223
 - interests, 58, 67, 184
 - inventiveness, 4
 - management, 5, 34, 166, 208, 216–217
 - ownership, 53, 169
 - resources, 4, 116, 125, 240
 - rights, 11, 41, 136, 228
 - rules, 218, 223
- colleges, 285, 288–289
- co-management, 11, 126, 130, 132–134
- co-mapping, 148
- commercial building owners, 188–189, 191
- commitments, 80, 82, 129, 169, 172, 175, 192, 196–197, 208, 221
- commodification, 4, 119, 227
- commodity housing, 172, 175
- common
 - goods, 4–5, 156, 220
 - heritage, 267, 271
 - interests, 40, 52, 137, 189
 - lands, 2, 39, 209, 211, 284, 286, 290, 295, 305–306
 - ownership, 36, 38–39
 - pool resources 2 *see* CPRs.
 - property, 34, 156–158, 270–271, 295–297, 303–306
 - literature review, 204–205
 - resource management, 41–42
 - resources, 40–41, 99, 101–105, 216–220, 223–224, 269
 - contested, 7, 89
- commoners, 9, 155, 164, 171
- commoning, 4–5, 104–106, 169, 172
- common-pool resources, 6–7, 20, 23, 80, 108, 178, 242, 269
 - management, 18–19
- common-property regimes, robustness, 295–306
- commons 4 *see also* Introductory Note
 - analysis, 4, 9, 79, 85, 88, 122, 157, 163, 167
 - cultural, 165, 172, 175
 - definitions, 3

- dilemmas, 22, 30, 32, 55–56, 60–61, 180
- diversity, 13, 284–285, 287, 290
- framework
 - urban, 7, 80, 124, 161, 163
- global, 188, 241, 313, 315
- governance, 9, 13, 20, 100, 102–103, 105, 201, 230
- humanitarian, 94, 97
- knowledge, 3, 13, 50, 106, 174
- literature, 1, 3–4, 7, 9, 33, 165–166, 310, 312
- members, 13, 165, 284, 286, 291
 - as metaphor and praxis, 166
- models, 9, 12, 21, 165
- new, 11, 55–56, 245, 250
 - restoring and constructing, 245–251
- open, 244–245, 251
- principles, 7, 83–84, 87
- problems, 7, 12, 20, 58–59, 251, 255, 257, 259, 262
 - regulatory, 12, 273–274, 283
- productive, 9, 105–106, 108
- regulatory 12 *see* regulatory commons.
- resource data, 49, 54
- restoration, 242–251
- scholarship, 2–3, 5, 12, 27, 33, 56, 79, 88, 103
- sustainable, 24, 37
- tangible, 63–64
- temporal, 7, 55–56, 58–59, 61–65, 104
- traditional, 63, 65, 166
- tragedy of the, 22, 90, 156, 176, 22, 180, 296, 219, 165–166
- urban 3 *see* urban commons.
- institution-building, 166, 168
- institutions, 6, 137, 156, 164, 168–169
- management, 123, 170, 229–230, 264, 267
- research, 1, 3, 5–6, 18, 23, 91, 241
 - extensions and innovations, 22–24
 - theory, 3, 5, 7, 11–12, 17–18, 23–24, 84–85, 87
 - application to public housing, 83–84
 - origins and extensions, 17–25
 - urban, 80, 88, 113, 115–116
- Communal Areas Management Program for Indigenous Resources (CAMPFIRE), 227
- communal conservancies, 229, 232, 234, 237–240
- Communal Conservancy Program (CCP), 229, 237
- communication, 45, 75, 99, 104, 107, 146–147, 221, 224, 310, 317
- communities, 4–5, 97–98, 121–123, 140, 143–147, 150–152, 170–173, 206–209, 228–232, 239–240
 - homogenous, 208, 231
 - irrigation, 2, 180, 304
 - local, 126, 128, 143–145, 205, 210–211, 226–228, 232, 235–236, 239–241
 - rural, 10, 234–235
 - social, 156, 244
 - urban, 37, 125
 - vulnerable, 99, 123
- community
 - attributes, 195, 197–198, 200
 - benefits, 84, 244
 - building, 84, 141, 149, 175
 - buy-in, 97, 228
 - control, 170–171, 173, 175
 - development, 141, 175
 - empowerment, 207, 209
 - engagement, 147–148, 150
 - health, 119
 - education, 91
 - navigators, 47
 - housing, 172
 - land trusts 9 *see* CLTs.
 - members, 85, 145–146, 148–149, 228, 230, 232–235, 237, 239–241
 - participation, 90, 117, 173, 235, 278
 - resource data, 6, 47–49, 53
 - definition, 45–46
 - resource directories, 46–49
 - resources, 46, 93, 97, 136
- community-based conservation 226 *see* CBC.
- community-based governance, 175, 228, 230
- community-based institutions, 92, 125, 203
- community-based wildlife management 11 *see* CBWM.
- companies
 - private, 132, 139, 188, 264–267
 - seed, 276–277, 280, 282–283
- competition, 27, 90, 103, 236, 241, 258
- complaints, 107, 222, 233
- compliance, 10, 53, 160, 197–198, 222, 224
- conceptual frameworks, 21, 95, 166, 182, 205–206
- conceptualization, 1, 3, 5, 8, 172, 177, 179, 187, 310, 315
- Concord, 7, 66–70, 73–75
- conflict resolution, 21, 62, 168, 209, 220, 222–223, 228, 236, 305
- conflicts, 207–208, 210, 212, 221–222, 231–232, 234–236
 - tradeoff, 11, 231
- connectivity, 225, 310
- consensus, 173, 208, 211, 227, 314–315
- conservancies, 231–234, 237–240
 - communal, 229, 232, 234, 237–240
 - governance, 234, 239
 - Mayuni, 238–239
- conservancy committees, 237, 239–240
- conservation, 61, 229–232, 238, 240, 278, 284, 286, 290
- community-based 226 *see* CBC
- easements, 61, 291
- organizations, 227, 238, 240
- soil, 207
- tools, 13, 284, 286
- consortia, 96–99
- constitutional
 - amendments, 12, 278
 - obligations, 279–280
 - rules, 101, 221
- constructed
 - commons, 5
 - wetlands, 243, 248–250
- construction, 11, 22, 40, 136, 233, 235, 242, 245, 247, 251
 - infill, 83, 86–87
- consultation, 87, 93, 159, 235, 283
- consumption, 2, 8, 63, 65, 104, 177, 243
 - of nature, 227
- contagion, behavioral, 194, 199–200

- contestation, 8, 96, 155
- contested commons, 7, 77
- contextual factors, 205, 207–208, 213
- contractors, 6, 53, 196
- contracts, 53, 98, 169, 311
- control, 5, 7, 9–10, 87–88, 107–108, 116, 181, 184, 268
 - centralized, 138, 280
 - community, 170–171, 173, 175
 - epidemic, 91, 93–95, 97, 99
 - political, 176, 179
 - population, 6, 27, 29–31
 - state, 104, 107, 227, 311
- cooperation, 7, 36–37, 66–69, 73–76, 108, 235, 295–297, 299–306
 - breakdown, 13, 296, 299, 305–306
 - climate, 73, 75
 - inter-organizational, 90, 96
 - local, 90–91
 - social, 125, 127
- cooperative
 - investments, 296, 299–302, 306–307
 - payoffs, 301–303, 307
- coordination, 70–71, 91, 97–98, 121, 129, 135, 239
- co-production, 48, 126, 181
- corruption, 82, 96, 227
- costs, 50–51, 106, 196, 219, 222–223, 233, 255, 298, 304
 - investment, 298, 301
 - lower, 52, 102, 193
 - maintenance, 249, 304
 - marginal, 2, 299
 - transaction, 101–105, 229, 259
- courts, 159, 258, 260, 262, 271, 275, 281
 - federal, 12, 82, 276, 280–282
 - state, 12, 276, 281–283
- Covid-19, 240–241
- cows, 249–251, 256, 258–259, 276
- CPRs (common pool resources), 2–3, 17–19, 55–56, 177–178, 206–211, 213–215, 242–243, 295–297
 - conceptual framework and methodology, 205–206
 - contextual factors of institution building, 207–209
 - development, 10, 203–205, 207, 209–210, 215
 - projects, 206–208, 213
 - facilitated, 203–215
 - findings, 206–207
 - implementation dynamics, 212
 - management, 204–205, 214, 297
 - organizational processes and role of facilitating agency, 209–212
 - vs public goods, 242–243
 - and reconstructed commons, 251
- creativity, urban, 129, 134–135
- crime, 174, 176
- crises, 8, 82, 89–90, 96–97, 99, 211, 214, 232
 - humanitarian, 7, 89–91, 99
- CSOs *1 see* civil society organizations.
- cultural
 - assets, 127, 129
 - commons, 165, 172, 175
 - heritage, 227, 275–276
 - culture, 4, 28, 58, 136, 138, 159, 172, 175, 197, 223
 - curation, 48, 53
 - curricula, 144, 149–150
 - co-design, 144
 - customary leaders, 239
 - cyber peace, 310, 313, 315, 317
 - cyber sovereignty, 313
 - cybersecurity, 309, 312, 315–316
 - enhanced, 309, 313
 - cyberspace, 13, 310–311, 313, 315–316
 - polycentric nature, 311, 315
- Dallas, Texas, 197, 200
- Darchen, Sébastien, 159
- data
 - collaborative, 52
 - collaborative model, 52–53
 - community resource, 6, 45, 47–49, 53
 - governance, 13, 52, 310–313
 - infrastructures, 45, 50, 54
 - open, 7, 53
 - production, 52, 136
 - resource directory, 51, 53
 - resource 6 *see* resource data.
 - supply chain, 52–53
 - trusts, 50, 52–53
 - utilities, 50–51, 53
- databases, 46–48, 51–52
- dead areas, 245–248
- Deadlock, 71–72
- DeCanio, Stephen J., 69–71
- decentralization, 227, 236, 240–241
- decision-making, 9, 54, 89, 93, 117, 155–156, 163, 200, 230, 235
 - bases for claiming a stake in, 84–87
 - power, 127, 161–162
 - processes, 85, 87, 116, 118, 198–199, 224
- defection, 66–68, 72–73, 98, 297, 299–300, 303
 - payoff, 307
- deforestation, 56–57, 218
- degradation, 19, 21, 30, 57–58, 162, 165, 203, 209, 223, 225
 - resource, 27, 209
- democracy, 9, 33, 128, 181
 - economic, 125, 128
 - political, 128
- democratic
 - engagement, 127
 - practices, 175, 204
- democratization, 7, 80, 92, 141, 186
- dependence, 136, 204–205, 221, 240
- depletion, 1, 156, 243, 284
 - resource, 60, 65
- design, 23, 49, 92, 98, 134, 144–145, 160, 213, 268
 - architectural, 139, 146
 - decisions, 140, 144
 - institutional, 3, 19, 50, 205
 - principles, 2, 20, 23–24, 203, 205, 217, 219, 222–223, 296, 304–305
 - Ostrom’s, 90, 93, 204–205, 213, 217, 220, 223, 304, 312

- destruction, 57, 60, 156, 162, 218, 242, 264, 287
- destructive overuse, 255, 262
- deterioration, 82, 87, 158, 165, 296, 298, 305
- detribalization, 40
- Detroit, 117, 172, 200
- developing countries, 12, 71, 90, 93, 96
- development, 18–19, 53–54, 58–59, 92, 126–128, 168, 212–213, 258, 271–272, 286–287
 - aid, 90, 95, 98
 - community, 141, 175
 - credits
 - tradable, 271–272
 - economic 60 *see* economic development.
 - human, 36, 138, 141
 - land, 57, 64, 284
 - rapid, 58, 257
 - rights, 166, 270
 - tradable, 12, 265
 - social, 4, 35
 - space, 12, 266, 271–272
 - sustainable, 90, 129, 314
 - watershed, 203, 205, 207
- dewatering, 12, 259–262
 - stream, 12, 259, 261
- Diamond, Jared, 57–58
- digital anticommons, 6, 46
- Digital Cold War, 13, 309–317
- digital
 - fragmentation, 313–314
 - innovation, 129, 134–135
 - skills, 132, 135
 - walled gardens, 49, 313, 316
- dilemmas, 3, 5, 7, 53, 56, 90, 205–206, 218–219
 - climate, 7, 66–75
 - collective action, 2, 49–50, 90, 94–95, 217–220
 - social, 1–3, 7, 20, 22, 24, 66–67, 91, 166, 220
 - social environmental, 216–225
- directories, resource, 45–54
- disadvantaged populations/groups, 135–136, 173, 287–288
- disasters, 68, 73, 90–91, 166
 - natural, 7, 91–92
- discharges, 247–248, 255
- discount factor, 13, 301–302, 305–306
- discretion, 160, 184, 210, 214
- discrimination, 285
 - racial, 289
 - reverse, 284, 291
- diseases, 58, 94, 108, 255, 279
- disinvested properties/neighborhoods, 167, 169
- disinvestment, 7, 79, 81, 83, 164
- displacement, 5, 83, 164, 167, 169, 275
- dispute resolution, 90, 182, 241
- disputes, 61, 228, 231, 237–238, 268
 - local, 236, 241
- distressed areas, 9, 128, 136
- district standards, 192
- distrust, 7, 99, 230
- diversity, 66, 75–76, 187, 189, 206, 233, 240, 284, 288–290
 - commons, 13, 284–285, 287, 290
 - educational, 284–285, 288, 290
- Djibouti, 185
- Doctors Without Borders, 89, 177
- documentary evidence, 199–200
- dominant strategies, 68–73
- donor organizations, 92, 96, 98
- donor-funded projects, 95, 205, 240
- donors, 98, 182, 209–210
 - international, 91, 96–97, 99
- dynamics, 5, 204, 206, 213
 - of implementation, 206, 212
 - local, 10, 214, 280
 - political, 159
 - social, 148
- early adopters, 192, 200
- easements, negative, 284, 286
- Easter Island, 57–58
- Ebola, 8, 91–99
- Ebola Business, 95, 99
- ecological systems, 8, 11, 107–108
- ecology, 29, 121, 258
- economies, market, 37, 101–102, 104
- economic
 - activities, 100–101, 103–105, 107–108, 159
 - benefits, 8, 85, 104, 227, 232, 235
 - democracy, 125, 128
 - development, 60, 71, 144, 231, 240, 261, 283
 - inclusive, 9, 136–137
 - efficiency, 105, 199, 214
 - empowerment, 134
 - institutions, 9, 100, 125, 136
 - profit, 176, 179
 - system, 8, 100–109, 125, 128, 256, 317
 - commons within, 103–107
 - as set of rules, 101–103
 - units, collective, 9, 124, 128, 136
 - value, 102, 105–106, 116, 221
- economies
 - collaborative, 5, 129, 134–136, 143–144
 - pooling, 135, 144
- ecosystem services, 114, 120, 261
- ecosystems, 57, 59, 114, 120–121, 135, 148, 221, 245, 262
 - riparian, 260, 262
 - urban forest, 113, 116
- eco-tourism, 226, 232–233, 236, 239–240
- education, 30, 47, 135, 138, 140, 147
 - higher, 12, 288–289
- educational diversity, 284–285, 288, 290
 - commons, 284
 - racial, 284, 290
- effective technology, 296–297, 304
- effectiveness, 41, 108, 175, 213, 227, 230, 316
- efficiencies, 8, 68, 89, 97, 103, 107, 258
 - economic, 105, 199, 214
 - resource, 188–190, 192, 196
- effluent, 246, 250
 - treated, 251
- elephants, 234
- elites, 4, 91, 99, 116, 122, 235
- embeddedness, 19, 22

- emissions, 10, 66–69, 71, 108, 188–190, 199–200
- empirical
 - evidence, 21, 88, 124, 128
 - research, 21, 97, 151, 180, 217, 223, 297
- empowerment
 - community, 207, 209
 - economic, 134
 - perspective, 139
- enclosure, 4, 13, 28, 166–167, 262, 284–291
 - agents of, 13, 284
- encroachments, 206–207, 209
- endangered species, 61, 64, 226, 250
- energy, 188, 191–192, 199, 312
 - baseline, 190–191
 - efficiency, 192, 196, 199–200
 - goals, 191, 197, 199
 - renewable, 68, 71, 73–74, 191
 - use, 10, 188–190, 192, 195, 197, 199–200
- enforcement, 12, 62, 79, 88, 108, 169, 189, 194–197, 199–200
 - citizen, 274, 276–277
- engagement, 33, 86–87, 100, 140, 146, 168, 175, 290
 - civic, 129, 136–137
 - community, 147–148, 150
 - democratic, 127
 - insights from Escola dos Sonhos and Caminhos da Escola, 151
 - strategies
 - for Caminhos da Escola, 150
 - for Escola dos Sonhos, 146–147
- English, Lydia, 287
- enjoyment, 126, 177–178
 - collective, 129
- entitlements, 240, 264
 - inequitable, 257
- environment, 64, 67, 166, 168, 186, 190, 213, 220, 247, 251
 - natural, 149, 251
 - operating, 10, 176
 - shared, 88
- environmental
 - damage, 222, 282
 - impacts, 8, 33, 86, 278, 282
 - management, 216, 222–223, 225
 - movement, 6, 29–31
 - resources, 7, 222, 224
- epidemics, 90–91, 93–95, 98–99
 - control, 91, 93–95, 97, 99
- equality, 9, 13, 147, 285, 291
- equilibrium, 68, 70
 - no conflict, 70
 - inferior, 7, 71
 - win-win, 7, 71
- equitable
 - distribution, 12, 230, 271
 - use, 80, 264
- equity, 11, 139, 199, 214, 270
 - intergenerational, 12, 273
 - limited, 5, 172
- equivalence, substantial, 12, 274, 280, 283
- erosion, 162, 236
 - soil, 57, 209, 279
- Escola dos Sonhos, 140–143, 151
 - engagement strategies, 146–147
- evaluation, 33, 73, 90, 93–96, 128
- evidence
 - documentary, 199–200
 - empirical, 21, 88, 124, 128
- evolution, 3–5, 35–36, 140, 167, 259, 310–311, 314
 - human, 6, 35, 41
 - social, 6, 34, 41
- evolutionary
 - economics, 8, 101
 - theory, 35–36
- exchange, 61, 102–103, 182–184, 232
- excludability, 8, 63, 177–178, 187
- exclusion, 2, 5, 24, 102–103, 170–171, 285–287, 291
 - rights of, 2, 286, 291
- expansion, 21, 40, 134, 242, 251, 256, 297
- experience, 7, 47, 52, 85, 87–88, 95, 98, 129, 140, 146
- expertise, 53–54, 97, 106, 122, 140, 209
- experts, 91, 93, 96, 116–117, 121–122, 129, 145
 - external, 129, 145
- exploitation, 60, 156, 165, 225, 267, 271, 286
- exploration, 27, 100, 108, 266–267, 310
- external
 - actors, 228, 235
 - agencies, 10, 203–205, 213, 215
 - agents, 224, 230
- externalities, 105, 109, 114, 168, 194, 221, 266
- facilitated common pool resources, 203–215
- facilitating
 - agencies, 10, 203–206, 208–214
 - organizations, 10–11, 205, 208–211, 213
- facilities, 17, 45–46, 160, 223, 246, 250
- failures, 53, 56, 71, 82, 135, 138, 204–205, 214, 219
 - market, 46, 53, 101, 108
- fairness, 160, 198, 230, 270
- families, 27, 37, 39, 60, 244
- farmers, 13, 67, 216–223, 237, 295–303, 305–307
- farming, 232, 238, 240–241, 258, 277
- farmlands, 156, 247–248
- feasibility, 87, 235
- federal courts, 12, 82, 276, 280–282
- federal funding, 47, 79
- federal governments, 46, 80, 203, 273
- fees, 47–48, 51, 226, 257, 268, 276
- field studies, 3, 168, 295, 299, 304
- financial investment, 9, 124
- financing, 5, 73, 143, 147, 157, 163
- finest, 295–296, 300, 307
- Finland, 185
- firewood, 233, 235
- fisheries, 2, 63, 103–105, 156, 180, 226, 242, 265, 296
- fishing, 57–58, 235
- flooding, 59, 86, 218, 248
- Florida, 51, 242, 249, 255
- flows, 87, 105, 126, 198, 232, 245, 248, 256, 260–262, 313
 - information, 89, 183
- food, 30, 58, 64, 126, 150, 159, 255
- foreclosures, 168, 173–174

- forestry, urban, 113, 115, 119–122
- forests, 8, 57, 59, 113–115, 120, 122, 203, 205, 231
management, 114, 119, 122, 205
riparian, 216, 218
urban 8 *see* urban forests.
- fossil fuels, 68, 71, 190
- Foster, Sheila, 1, 79, 115, 139, 157
- fragmentation, 160, 313, 317
digital, 313–314
- frameworks, 2–4, 10, 18, 21, 187, 216–217, 220, 312
conceptual, 21, 95, 166, 182, 205–206
IAD (Institutional Analysis and Development), 2–3,
9–10, 19–23, 182, 187, 195, 197–200
methodological, 3
regulatory, 10, 80, 83–85, 176, 183, 264
theoretical, 22, 80, 85, 93, 192, 217
- free
market, 100, 189, 193, 282
riders, 93, 106, 158, 194, 316
- freedom, 27, 30, 185, 256, 259, 262
- freedom to breed, 27
- freeriding, 13, 295–296, 298–303, 306–307
- Fremstad, Anders, 69–71
- fuels, 27, 151, 265, 309
fossil, 68, 71, 190
- functions, 11, 49, 158, 164, 168, 262, 269, 284, 287, 291
social, 7, 84–85, 131
- funders, 46, 50–51, 53, 171
- funding, 45–46, 51–52, 81, 96, 98, 106–107, 158, 184–185, 203
agencies, 210, 214
federal, 47, 79
- games, 66–74, 90–91, 93, 149, 233, 299
2x2, 66, 69–72, 75–76
asymmetric, 69–72, 75
map for changing, 70, 76
repeated, 295, 299, 307
stable win-win, 66, 74
symmetric, 69–70, 72, 75
theory, 3, 18, 66–67, 75
- GE (genetically engineered)/GMO (genetically modified)
crops, 12, 274–278, 282–283
- genetic
strangers, 37, 41
survival, 35–36, 39, 41
- genetically modified organisms 12 *see* GMOs.
- genocide, passive, 28–29
- gentrification, 87, 116–118, 122
- geo-political cities, 166, 168
- Gerhart, Peter, 60–61
- Germany, 18, 132, 244
- GKC (Governing Knowledge Commons), 312
- GLDC (Gujarat Land Development Corporation),
209–210
- global commons, 188, 241, 313, 315
- global pandemic, 240–241
- globalization, 309, 311, 313
- GMOs (genetically modified organisms), 12, 274–275, 277
- goals, 118–119, 121–123, 126, 128, 130, 134, 188–191, 289
district, 189, 192, 197, 199
- planning, 190, 196–197
- policy, 89, 129
- shared, 2, 5–6, 190, 199, 244
- voluntary, 10, 189
- Goldilocks level, 194
- goods, 3–4, 100, 105, 125, 177–179, 182, 193
associational, 178
club, 51, 192–193, 315
common, 4–5, 156, 220
private, 120, 177, 193, 316
public, 3, 18, 105, 177–178, 193, 242–243
and services, 107, 116, 119, 138, 177–178, 182, 184, 193
- governance, 4, 6, 84–85, 87–88, 107–109, 122, 126, 156–157,
227–230, 311–312
- BID, 161–162
- city, 155–156, 162
- collaborative, 7, 91, 135, 140, 161, 166
- collective, 125, 139, 161, 165, 223
- commons, 9, 13, 20, 100, 102–103, 105, 201, 230
- community-based, 175, 228, 230
- conservancies, 234, 239
- data, 13, 52, 310–313
- hybrid, 80, 311
- Internet, 13, 309–316
- local, 156, 158, 160–163, 228, 231, 276
- natural resource, 11, 21, 227–228, 230–231
- polycentric, 10, 141, 162, 188–200, 312, 316
- regimes, 2, 102, 107, 125, 180, 219
- self-governance, 10, 56, 164, 174, 180, 182
- structures, 101–102, 117, 170–171, 175, 204, 311
- systems, 93, 157, 171, 204, 220–221, 223, 312
- urban, 117, 121, 139, 141, 157, 161
- Governing Knowledge Commons (GKC), 312
- Governing the Commons*, 2, 6, 18–21, 23, 35, 156, 180
- government
actors, 117, 182, 185
agencies, 10, 45, 51, 184–185, 191–192, 205, 211, 224, 226, 305
officials, 61, 91, 96, 122, 151, 183, 216, 223
regulation, 7, 32, 56, 59, 61–62, 64–65, 80, 90, 156
- governments, 40–41, 61–62, 95–96, 138–139, 181–184,
186–187, 222–223, 271, 311–314
- central, 231, 233
- city, 124–125, 127–130, 155, 157–163
- federal, 46, 80, 203, 273
- Israeli, 243, 246–247
- local, 8, 21, 151, 157–158, 210, 273–275
- graduated sanctions, 62, 90, 199, 220, 304
- grants, 38, 98, 136, 179, 181, 209, 260, 281
- Gratz v. Bolinger*, 285, 287
- grazing, 34, 231–232, 235, 241
lands, 41, 226, 231, 265, 304
pastures, 2, 5, 32, 104–105
- green
infrastructure, 114, 244
spaces, 59, 86, 113, 119, 129, 245, 286, 288
- greenhouse gas emissions, 10, 66–69, 71, 108, 188–190,
199–200
- greenspaces, 59, 115, 245, 251, 290
- gridlock, 13, 284, 316
and anti-commons, 285–287

groundwater aquifers, 63, 166, 247, 256, 259
Grove, Morgan, 118
growth, 30–31, 136, 242, 262, 313–314
 population, 29–31, 33
Grutter v. Bolinger, 285, 287, 290
GS 291 *see* governance systems.
guardians, public, 286, 288
Guinea, 93, 97–98
Gujarat Land Development Corporation (GLDC),
 209–210

habitats, 11, 59, 61, 64, 242, 244, 247–250, 261, 280
Hardin, Garrett, 1–2, 5–6, 26–37, 41–42, 156, 255–257, 259,
 261–262
harm, 23, 39, 61, 64–65, 167, 193
 aggregated, 57, 59
 individual, 57, 270
harmony, 69–72, 241, 243
harvesting, 209–210, 267
 technologies, 20, 296
Harvey, David, 138
Hawai‘i, 273–283
 County, 276, 281
 Pesticides Law, 275, 277
 restorative justice under Constitution, 278–280
 Supreme Court, 276, 278, 280–281
Hawai‘i Papaya Industry, 275, 281–282
health, 6, 30, 45, 47–48, 60, 82, 86, 245, 275, 282
 benefits, 115, 245
healthcare, 47, 138, 312
Heller, Michael, 48, 284, 286
herders, 1, 31–32, 55, 59, 255
heritage
 common, 267, 271
 cultural, 227, 275–276
heterogeneity, 3, 11, 61, 208, 221, 224, 241, 297
hierarchies, 100, 106, 157, 260
higher education, 12, 288–289
hiking trails, 247, 250
history, 174, 182, 195, 207–208, 221, 282, 291, 309, 312
 institutional, 8, 90
homelessness, 47, 83, 159–160, 166, 168
homeowners, 165, 169, 171, 173–174, 286
homeownership, 169, 174
homes, 59, 94, 149, 164, 169–170, 174, 247
horses, 18, 23
houses, 57, 95, 171, 191, 196, 200, 233
housing, 4–5, 81–82, 84, 87, 134, 164, 167, 169–170, 172–173
 affordable, 7, 9, 80, 84–85, 164–165, 167, 169, 173, 175
 commodity, 172, 175
 community, 172
 providers, 164, 169, 175
 public 7 *see* public housing.
 units, 80, 87, 165, 169–170, 175
Houston, 58–59, 167
HSDS 50 *see* Human Services Data Specification.
Huawei, 13, 310, 314–315
human
 development, 36, 138, 141
 evolution, 6, 35, 41

resources, 90, 224
rights, 27, 167, 178, 314, 317
Human Services Data Specification (HSDS), 50–51
humane cities, 151
humanitarian
 aid, 1, 7–8, 89–99
 commons, 94, 97
 crises, 7, 89–91, 99
 intervention, 89–91
 responses, 8, 94–95, 99
Humphries, Jane, 32
Hunt, Terry, 58
hunting, trophy, 226, 232, 240
Hurricane Harvey, 59
hybrid governance, 80, 311
hydrographic basins, 217, 225

IAD (Institutional Analysis and Development), 2, 4, 10, 18,
 176, 189, 194–196, 205, 312
 action situations, 10, 176, 182
 framework, 2–3, 9–10, 19–23, 182, 187, 195, 197–200
IASC (International Association for the Study of
 Commons), 17, 241
ICANN (Internet Corporation for Assigned Names and
 Numbers), 311, 314, 317
ideal types, 11, 217, 219, 221
ideologies, 28, 33, 168, 207, 275, 280
IETF (Internet Engineering Task Force), 311, 314–315,
 317
ignorance, 12, 64, 214
implementation, 12, 90, 128, 130–132, 134–136, 148, 205–206,
 210, 214
 areas lacking in, 135–136
 dynamics, 206, 212
 iterative process, 212, 214
 research, 205, 214
incentive structures, 49, 66, 68–70
incentives, 6–7, 39–42, 73, 90, 192–193, 257, 295–298,
 300–306
 to cooperate, 299
 and technological improvements, 301–303
 in repeated game, 299–301
 restructuring, 66, 75
 social, 6, 34, 37
 strong, 12, 45–46, 48, 257, 273, 283, 303
 and technological change, 299–303
inclusion, 2, 86, 93, 127, 139, 149, 171
inclusive economic development, 9, 136–137
inclusivity, 114, 125, 137, 157, 161
incomes, 39, 80–81, 115, 117, 174, 203, 232–233, 239–240
independence, 38, 181, 183–184
India, 10, 203–215, 223
 Rajasthan, 206–207
Indiana University, 17–19, 45, 179
indicators, biophysical, 211–212
indigenous peoples, 36, 275–276, 281, 283
inefficiencies, 8, 71, 91, 93, 97, 105, 258, 284
inequalities, 8, 73, 102, 104, 115, 122, 138, 161, 234, 240
 social, 229, 289
 socio-economic, 230

- inferior equilibrium, 7, 71
- infill construction, 83, 86–87
- infomediaries, 9, 51–52
- informal associations, 182–183
- informal groups, 132, 136, 176
- informal institutions, 11, 64, 185–186, 226
- informal management, 126, 269
- information, 3–4, 6, 45–49, 52, 87, 106, 196, 220–221
 - community resource, 45, 47
 - exchange, 97–98, 225
 - flows, 89, 183
 - public, 45–46
 - service, 46, 51
 - transfers, 238
- infrastructure, 8, 98, 104–107, 124, 126, 136, 190, 221, 310
 - data, 45, 50, 54
 - green, 114, 244
 - tools, 6, 52
 - urban, 1, 126
- inhabitants, 116, 137, 147, 217–218
 - city, 121, 124–129, 134–136, 161
- initiatives, 52, 82–86, 120, 226–227, 232, 240, 268, 277
 - CBC, 227–228, 236
- innovations, 3, 5–6, 18, 20, 22, 68, 136, 314
 - digital, 129, 134–135
 - social, 135–136
- inspections, 183, 222, 224, 276
- institution building, 204, 206–207, 209–210, 214
 - commons, 166, 168
- institutional
 - analysis, 10, 18–23, 176, 192, 195, 205, 241
 - arrangements, 5, 8, 10, 18–19, 22–23, 92, 99, 107–108, 125
 - design, 3, 19, 50, 205
 - histories, 8, 90
 - rules, 96–99
 - solutions, 95, 205
 - structures, 46, 168, 194, 200
 - synergy, 228, 241
- institutions, 9, 18–19, 21–22, 51, 98, 149–150, 203–204, 211, 214–215, 288
 - community-based, 92, 125, 203
 - customary, 237–238
 - economic, 9, 100, 125, 136
 - existing, 122, 208, 228
 - informal, 11, 64, 226
 - international, 99, 268, 270–271
 - knowledge, 128, 139
 - learning, 148–149
 - legal, 168, 181
 - local, 92, 148–149, 211
 - new, 5, 9, 231
 - self-governing, 2, 204
 - traditional, 92, 204
 - weak, 92, 94
- integrated policy programs, 9, 124, 128
- integration, 11, 278, 291
- intellectual property, 104, 273, 309
- intentions, 93, 118, 140, 182, 314
- interactions, 93, 98, 101, 116, 182, 195, 200, 204–205, 221, 223
 - complex, 11, 214
 - one-shot, 75, 300, 303
 - repeated, 75, 296, 299
 - serendipitous, 140, 152
 - social, 11, 19, 37, 86, 104, 139, 141, 149, 152, 245
 - structured, 189, 195
- interdependence, 22, 175, 181–182, 259
- interests, 22, 53, 55, 60–62, 64, 159, 162–163, 222, 284, 288–291
 - collective, 58, 67, 184
 - common, 40, 52, 137, 189
 - individual, 67, 171, 218
 - legitimate, 4, 260
 - narrow, 137, 158, 162–163
 - private, 61, 103, 105, 109, 116, 157, 224
 - public, 171, 260–261, 271, 279
 - vested, 57–58, 156
- intergenerational equity, 12, 273
- intermediaries, 48, 50, 52–53, 179, 237
- International Association for the Study of Commons 17 *see* IASC.
- international
 - donors, 91, 96–97, 99
 - institutions, 99, 268, 270–271
 - intervention, 91, 96
 - law, 12, 266–268, 270–271
 - NGOs, 93, 95–99
 - organizations, 8, 89–91, 94–98, 270
 - responses, 8, 91–92, 94, 97–98
- Internet, 13, 47, 104, 106, 310–312, 314
 - access, 314, 316–317
 - governance, 13, 309–316
 - relevance to commons literature, 312–313
 - of Things, 13, 310, 314–316
- Internet Corporation for Assigned Names and Numbers 311 *see* ICANN.
- Internet Engineering Task Force 311 *see* IETF.
- inter-organizational cooperation, 90, 96
- interpretation, 28, 220, 267
 - qualitative, 217, 223
- interventions, 35, 49, 129, 132–134, 203–206, 208–209, 211–212, 214
 - humanitarian, 89–91
- interviews, 8, 91, 93, 97, 130, 223
- inventiveness, collective, 4
- investment costs, 298, 301
- investments, 2, 13, 199–200, 264, 267, 296–299, 301–308
 - cooperative, 296, 299–302, 306–307
- IoT (Internet of Things), 13, 310, 314–316
- irrigation, 221, 256, 304–305
 - communities, 2, 180, 304
 - systems, 2, 13, 104, 221, 295–299, 301–302, 304–306
 - existing, 13, 295–296, 298, 305–306
 - primitive, 13, 295–298, 305
 - waters, 258, 265
- islands, 57–58, 275–276, 278, 282
- Israel, 6, 11, 34–35, 38–39, 41, 242, 245, 247–248
 - Government, 243, 246–247
- Italy, 4, 132
 - cities, 8, 126–127
- Itanhém River Basin, 11, 216–225

- Itanhém River Basin (cont.)
 collective action dilemmas, 217–220
 hypsometric map, 218
 methodology, 220–221
 iterative processes, 10, 212–214, 219
- Japan, 2, 89, 180, 295, 305
 Jodha ka Kheda, 211–212
 Johnstone, Eleanor, 189, 192
 joint ventures, 229, 232, 239, 241
 Jucuruçu River, 11, 216–217
- Ka Makani Ho’opono, 281
 Kaua’i, 275–276, 279, 282
Kelly v. 1250 Oceanside Partners, 279, 281
 Kenya, 180, 226
 kinship, 6, 34–42
 and evolution of the commons, 36–38
 relations, 6, 34–35, 37–38, 41
 knowledge, 85, 87–88, 97–98, 101–102, 104, 106, 141–145, 175, 224–225
 commons, 3, 13, 50, 106, 174
 institutions, 128, 139
 local, 48, 95, 97, 140, 143–145, 149, 151
 scientific, 140, 152, 214
 urban, 7, 85
 Koidu, 93, 98
 Kundeli, 211
- land
 ancestral, 227, 233
 CLT, 170–171
 common, 2, 39, 209, 211, 284, 286, 290, 295, 305–306
 development, 57, 64, 284
 grazing, 41, 226, 231, 265, 304
 ownership, 9, 164, 169, 234, 256
 private, 118, 120
 public, 118, 279
 resources, 34, 36, 38, 93, 171–172
 rural, 232, 236
 tenure, 9, 164, 221, 227, 236–238, 240
 urban, 121, 167
 use, 157, 167–168, 170, 237, 284
 vacant, 4, 167
 values, 5, 168, 170
 landlords, 5, 173
 landowners, 60, 117, 218, 284, 290–291
 landscape, 57, 161, 176
 urban, 8, 111, 157
 language, 4–5, 9, 152, 157
 later-in-time entrants, 256–257
 law, 182–186
 coercive, 12, 256–257
 customary, 237, 241
 federal, 7, 81–82, 250, 276
 international, 12, 266–268, 270–271
 leaders, 70, 72, 182, 212, 223, 239
 business, 58, 158
 customary, 239
 traditional, 237, 239
 leadership, 47, 52, 98, 173, 188, 196–197, 209, 221, 230
- learning, 73, 101, 128, 143, 149, 214, 225
 institutions, 148–149
 Lefebvre, Henry, 116, 139
 legal
 form, 182–183
 formalism, 274–276
 institutions, 168, 181
 recognition, 9, 124
 rules, 167–168, 182–186, 255
 status, 184, 237
 legislative power, 279, 281
 legislatures, 155, 189, 260, 279
 legitimacy, 83, 97, 161, 232, 236, 239
 legitimate interests, 4, 260
 levels of action, 19, 22, 24
 leverage, 51, 127, 239
 liability, 129, 233, 276
 liberalism, classical, 27
 Liberia, 93, 95
 licenses, 140, 227, 268
 linkages, 18, 22, 41, 74, 237
 Lipo, Carl, 58
 livelihoods resources, 10, 203, 226–227, 233, 296
 livestock, 38, 224, 240
 local
 actors, 8, 91, 141, 143, 163, 199
 beneficiaries, 95, 99
 businesses, 128–129, 131, 134, 149–150, 155
 buy-in, 8, 91, 96
 communities, 126, 128, 143–145, 205, 210–211, 226–228, 232, 235–236, 239–241
 conditions, 62, 90, 205
 cooperation, 90–91
 dynamics, 10, 214, 280
 governance, 156, 158, 160–163, 228, 231, 276
 governments, 8, 21, 151, 157–158, 210, 273–275
 institutions, 92, 148–149, 211
 knowledge, 95, 97, 140, 143–145, 149, 151
 level, 92, 108, 128, 137, 273, 281
 organizations, 8, 47, 90–92, 94–99
 services, 47, 138, 157, 163
 localities, 81, 149, 208–209, 243, 251
 localized biocultural resource management, 278, 280
 Locke, Dexter, 118
 logic, 19, 21, 67, 177–178, 217, 255, 299
 Los Angeles, 19, 159, 167, 172, 197
- maintenance, 13, 18, 20, 46–48, 50, 52, 289, 295–297, 304
 costs, 249, 304
 major technological improvements, 13, 295–296, 298, 301–303, 305
 malfeasance, bureaucratic, 95, 99
 management, 21, 34–35, 99, 121–123, 126–127, 166–167, 216–217, 227–229, 284, 305
 collaborative, 11, 118, 227
 collective, 5, 34, 166, 208, 216–217
 of CPRs, 204–205, 214, 297
 effective, 40, 230
 environmental, 216, 222–223, 225
 forest 114 *see* forests, management
 informal, 126, 269

- of natural resources, 12, 21–22, 27, 92, 188, 227, 231, 237, 239
- resource, 10, 55, 57, 59, 63–64, 162, 165, 278, 280
- sustainable, 6, 35, 297
- top-down, 8, 91, 122
- water, 217, 220
- managers, 13, 190, 197, 203, 205, 211–214
- maps, 66, 76, 115, 119–120, 156, 175, 246
- marginal costs, 2, 299
- market
 - economy, 37, 101–102, 104
 - failure, 46, 53, 101, 108
 - forces, 164, 275
 - prices, 68, 106, 198
 - rates, 83–84, 87
- markets, 4, 46, 61, 92, 101–103, 107–108, 165–166, 270–271
 - free, 100, 189, 193, 282
 - speculative, 9–10, 164
- Mattei, Ugo, 127
- Maui, 275–277, 280–282
- Mayuni conservancy, 238–239
- meetings, 10, 30, 97, 103, 130, 135, 189, 192, 224, 299
- Mellon Foundation, 285, 287–290
- Mellon Mays Undergraduate Fellowship 285 *see* MMUF
- member businesses, 155, 159–160, 162
- membership, 47, 80, 172, 196, 199, 230–231, 237, 285
 - benefits, 193–194
 - requirements, 177–178
- methodological frameworks, 3
- methodology, 3, 127, 148, 151, 191, 205, 220
 - collaborative, 146
- metrics, 90, 94, 130, 190–191, 227
- MFLs (minimum flows and levels), 261–262
- Michelman, Frank, 285
- middle swaps, 71
- mid-sized cities, 81, 158
- Million Trees NYC 117 *see* MTNYC
- minimum
 - flows and levels 261 *see* MFLs
 - rights recognition, 220, 222
- minor technological improvements, 13, 295–296, 298, 302–303, 305
- minority students, 13, 285, 289–291
- mismanagement, 7, 79, 82, 95–96
- mission statements, 45, 287–289
- MMUF (Mellon Mays Undergraduate Fellowship), 285, 287–290
- mobility, 60, 136, 149, 170, 221
- Modan, Gabriella, 159
- models, 9, 50–53, 66–67, 70–71, 75, 192–193, 216–222
 - 2 x 2, 75
 - architectural, 144, 149
 - cardboard, 146
 - collective action, 7, 56, 59, 62, 65
 - commons, 9, 12, 21, 165
 - conceptual, 10, 188–189
 - data utility, 51, 53
 - hypothetical, 50–51, 53
 - service registry, 51, 53
- Moku, 278, 280, 283
- money, 5, 95–96, 98–99, 179, 222, 224, 246, 256, 265, 267
- monitoring, 90, 93–96, 195–197, 220–224
- Monsanto, 277–278, 280
- Moon, 264–272
 - Treaty, 266–267, 271
- Moor, Tine de, 32
- morality, 31–32, 262
 - social, 27
- moratoria, temporary, 275, 277, 282
- MTNYC (Million Trees NYC), 117–118
- multi-layered polycentric management system, 98, 224
- multiple
 - actors, 2, 32, 157, 162, 219
 - parties, 48, 157, 284
 - stakeholders, 9, 130–131, 135–136, 158, 165, 169, 311–312, 317
- multi-sector collaboration, 147, 151
- municipal policy, 167, 174
- municipalities, 143, 149, 156, 174, 217–218, 242, 259
 - local, 140, 149
- mutirão*, 138, 141, 145
- MYRADA (Mysore Resettlement and Development Agency), 206, 209–210
- Namibia, 11, 226–229, 240
 - conservancy program, 229, 233–234, 239
 - northwest, 233
 - and Tanzania compared, 232–239
- national
 - baselines, 191–192
 - security, 311, 314
- natural
 - disasters, 7, 91–92
 - environment, 149, 251
 - resources, 17, 21–23, 58–61, 203, 218–219, 226, 231, 238
 - commons, 105, 255
 - governance, 11, 21, 227–228, 230–231
 - management, 12, 21–22, 27, 92, 188, 227, 231, 237, 239
- negative easements, 284, 286
- neighborhoods, 4–5, 39–40, 122, 124, 129–130, 148–149, 159, 174
 - as institutional spaces for civic engagement and social/solidarity economic units, 136–137
 - residents, 40, 129, 132, 174
- neighbors, 39, 45, 89, 135, 190, 194, 286
- neoliberalism, 93, 119, 173, 227
- networks, 9–10, 52, 98, 120, 150, 195, 197, 200, 315–316
- New York City (NYC), 7, 80–82, 88, 113–123, 158, 160, 167
 - see also* NYCHA
 - trees, 116–117
- New Zealand, 185
- NGOs (non-governmental organizations), 91–92, 98, 131–132, 135–136, 178–179, 203, 209–211, 230
 - domestic, 8, 91
 - international, 93, 95–99
 - local, 91, 128–129, 143, 148
- nomadic societies, 6, 36, 40
- non-compliance, 94, 168, 189, 194, 223–224, 277
- non-governmental organizations 267 *see* NGOs
- non-minority students, 287–289
- non-owners, 165, 171, 290

- non-profit organizations (NPOs), 6, 45, 47, 93, 178–179, 311–312
- non-spacefaring nations, 267–268, 270–271
- norms, 2, 36, 64–65, 93–94, 96, 98, 155–156, 258–259
 - behavioral, 99, 198
 - social, 5, 11, 37, 85, 185, 231, 241
- North, Douglas, 64
- North Korea, 180, 185–186
- northeast Namibia, 237–239
- northwest Namibia, 233
- NPOs (non-profit organizations), 6, 45, 47, 93, 178–179, 311–312
- Nuremberg, 244
- nutrients, 11, 57, 64, 108, 248–250
- NYC 7 *see* New York City.
- NYCHA (New York City Housing Authority), 7, 79–88 *see also* New York City.
 - assets, 84–85, 87
 - campuses, 83–84, 86
- Nzérékoré, 93, 97–98
- obligations, 55, 60, 84, 157, 183, 261, 279
 - constitutional, 279–280
 - public trust, 184–185, 278–279, 281
- officials, 31, 204–205, 212, 214, 316
 - city, 5, 166
 - government, 61, 91, 96, 122, 151, 183, 216, 223
 - public, 83, 95, 151, 160, 171
- O'Neill, John, 55, 58, 60
- open access resources, 1–3, 103, 106, 269
- open data, 7, 53
 - infrastructure, 45–54
- Open Referral Initiative, 6, 46, 49–50
- open resource data production, sustainable, 50–53
- open spaces, 39–40, 86, 107, 127, 149, 242, 245, 251
- open standards, 46, 50
- openness, 160, 162, 233, 269, 279
- operational rules, 62, 101, 221
- organizational processes, 205–206, 209–211
- organizations, 45–48, 50–51, 97–99, 101–102, 176–179, 206–207, 209–214, 241, 289
 - facilitating, 10–11, 205, 208–211, 213
 - new, 228, 236
 - non-governmental 91 *see* NGOs.
 - sponsoring, 196–197
- organized civil society, 222–224
- Orlando, 11, 242–243, 248–251
- OST 266 *see* Outer Space Treaty.
- Ostrom, Elinor, 2–3, 5–6, 18–24, 32–33, 179–180, 217, 272, 295–296, 304–305
 - commons, 23–24, 140
 - design principles, 90, 93, 204–205, 213, 217, 220, 223, 304, 312
 - IAD framework 2 *see* IAD (Institutional Analysis and Development).
 - on irrigation technologies, 305
- Ostrom, Vincent, 180, 312, 316
- Ostrom Workshop, 17, 19, 45, 309
- outcomes, 21–22, 24, 67–70, 73–75, 101, 104, 108, 182, 195, 199
 - best, 68, 74
 - ranking, 66–69, 73–74
 - social, 11, 126, 232, 312
 - socio-ecological, 11, 230
 - sociopolitical, 181, 186
 - worst, 7, 68–69, 71, 73, 75
- outer space, 12, 264–272, 306
- Outer Space Treaty (OST), 266–268, 270
- over-appropriation, 61, 64, 297
- over-consumption, 2, 12, 56, 63, 243, 269
- overgrazing, 1, 67
- overpopulation, 27, 31
- overuse, 19, 21, 156, 165–166, 251, 257–261, 284, 286
 - destructive, 255, 262
 - tragic, 255, 262
- owners
 - building 10 *see* building owners.
 - business, 158–160, 192
 - property 60 *see* property owners.
- ownership
 - collective, 53, 169
 - common, 36, 38–39
 - land, 9, 164, 169, 234, 256
 - private, 36, 57, 60–61, 90, 157, 165, 167, 180, 267–268
 - structures, 164, 297, 304
 - alternative, 164, 303–304
- ozone, 57, 114, 120
- pacts, 8, 129–136, 143
 - collaboration, 8, 127, 129–132, 143
 - objects, 132–135
- Palestine, 245–247
- pandemics, global, 240–241
- Parchomovsky, Gideon, 284, 286–288, 290
- Pareto-inferior equilibrium, 68, 71
- parks, 114, 117, 125, 132–134, 243–245, 247, 250–251, 260, 286, 288
 - public, 156, 284, 287
- participants, 2, 20–21, 174–175, 178, 183, 198–199, 204, 219, 271
 - district, 192, 199
- participating building owners, 189, 191, 200
- participation
 - community, 90, 117, 173, 235, 278
 - cost, 194, 199
 - level of, 227, 235
 - local, 89, 92
- participatory processes, 92, 122
- partnerships, 129, 131–133, 135–136, 143, 148, 238, 240
 - bilateral, 132, 135–136
 - public-community, 126, 129
 - public-private, 7, 83, 85, 87, 132
- passive genocide, 28–29
- pastures, 32, 38, 67, 105, 203, 207–210, 212, 242, 249–251
 - open, 1–2, 59
 - shared, 67, 165
- pathways, 66, 72, 74–75, 188–190
 - multiple, 66, 73
- patience requirement, 296, 301–302

- patrons, 190, 209–210, 213
- payoffs, 68–75, 169, 296, 299–302, 307
 - cooperative, 301–303, 307
 - defection, 307
 - punishment, 300–301, 303, 307
 - rules, 20, 24, 183
 - structure, 68, 71
 - swaps, 66–67, 69, 71–72, 76
- peace, cyber, 310, 313, 315, 317
- Pedra Furada, 141, 145
- peer-to-peer approaches, 106, 143–144, 152
- penalties, 73, 222–223, 277
 - civil, 276
- perceptions, 89, 117, 120, 139, 209, 214, 230, 233, 235, 239–240
- Periodic Table of 2x2 Games, 70–71
- permissive rules, 182–187
- perpetuity, 12, 61, 169–170, 173, 271
- Peruíbe, Itanhém, and Jucuruçu River Basin Committee
 - 11 *see* CBHPIJ.
- pesticides, 216, 275–277
- Philadelphia, 167, 197
- Philippines, 2, 180, 295, 304–305
- pilot experiments, 50–51, 53, 175
- pipeline program, 285, 287
- Pittsburgh, 191–192
- planetary resources, 265
 - common ownership, 268–270
 - private ownership, 267–268
- planning
 - goals, 190, 196–197
 - targets, 190
- plantations, 203, 211–212, 279
- plants, 116–118, 135, 141, 173, 211, 248–251, 274, 276
- players, 68, 73, 148, 162
- plenary sessions, 216, 222–224
- police, 161, 236
 - powers, 274
- policies, 45–46, 65, 91, 93, 122, 124, 126–128, 240–241
 - municipal, 167, 174
- policy
 - failures, 8, 90, 92, 98
 - goals, 89, 129
- policy-makers, 8, 125, 167, 206, 315
- political
 - economy, 9, 18, 81, 88, 127, 136, 205
 - parties, 176
- politics, 21, 68, 155, 212
- pollination, 275–276
- pollutants, 105, 246, 248
- polluted streams, 242, 251
- pollution, 29, 64, 67, 74, 189, 192–193, 216, 246–247, 259
 - air, 30, 64, 119, 277
- polycentric
 - governance, 10, 141, 162, 188–200, 312, 316
 - systems, 94–95, 108, 135, 312, 316–317
- polycentricity, 13, 49, 189, 310, 312, 316
- pooling economies, 135, 144
- population, 28, 31–32, 39, 101–102, 177–178, 215, 218, 222
 - bomb, 28, 31
 - control, 6, 27, 29–31
 - growth, 29–31, 33
 - urban, 114, 122
- Portugal, 185
- Potoski and Prakash's club theory 189 *see* club theory.
- power(s), 95, 122, 125, 141, 158–163, 238–239, 316
 - decision-making, 127, 161–162
- police, 274
 - relations, 205, 209
- precautionary principle, 12, 64–65, 273, 279
- predation, 255–256
- preemption, 274–275, 282–283
- Prep Schools, 194, 199–200
- preservation, 61, 125, 214, 224, 247, 267, 271
 - rules, 222–223
- prices, 68, 103, 160, 259
 - below-market, 165, 175
 - market, 68, 106, 198
 - resale, 169, 172
- principles
 - animating, 12, 264
 - design, 2, 20, 23–24, 203, 205, 217, 219, 222–223, 296, 304–305
- prior appropriation, 12, 255–262
 - doctrine, 11–12, 257, 260–261
- priorities, 46, 49, 53, 122, 209, 211–212, 214, 256–257
 - community, 11, 213
- Prisoner's Dilemma, 7, 66–75
- private
 - actors, 158, 286, 290
 - benefits, 193, 271
 - companies, 132, 139, 188, 264–267
 - enterprise, 1, 12, 275, 280
 - goods, 120, 177, 193, 316
 - interests, 61, 103, 105, 109, 116, 157, 224
 - ownership, 36, 57, 60–61, 90, 157, 165, 167, 180, 297
 - planetary resources, 267–268
 - property, 34, 36, 40–41, 56, 59–61, 167–168, 255, 267–270, 276
 - rights, 2, 4, 39, 41, 56, 62, 166, 173, 267
 - sector, 81, 83–85, 87–88, 158, 164, 188, 313, 315
 - trees, 114, 116, 119–121
- privatization, 32–33, 39, 104–105, 107, 116–117, 160, 167, 262, 269
- privileges, 9, 117, 176, 182, 282
- problem-solving, 182, 212
- process, iterative, 10, 212–214, 219
- processes, 34, 52–53, 101, 117, 124–125, 140, 159–160, 213, 224–225, 230–231
 - co-design, 129, 151
 - decision-making, 85, 87, 116, 118, 198–199, 224
 - iterative, 10, 212–214, 219
 - organizational, 205–206, 209–211
 - participatory, 92, 122
 - sedentarization, 34, 39
 - social, 4, 104
 - urbanization, 6, 34
- productive commons, 9, 105–106, 108
- productivity, 207, 209, 297, 304–305
 - agricultural, 57, 297, 305

- profitability, 162, 211
- progress, 36, 189, 195–197, 199, 234, 248
 - technological, 13, 295, 303, 306
- project actors, 140, 144, 150–151
- proof, 251, 279, 282
- property, 4, 60–61, 83–86, 159, 165, 262, 264–266, 268, 270
 - common, 4, 6, 34, 156–158, 165, 267, 270–271
 - intellectual, 48, 104, 273, 309
 - law, 9, 157, 163, 167, 169, 268
 - owners, 60, 116–117, 121, 155, 158, 161, 196, 268
 - private, 60–61, 85
 - private 4 *see* private property.
 - rights, 3, 103, 106, 163, 165, 168, 170–172, 221
 - private, 2, 4, 12, 39, 41, 56, 62, 166, 173, 267
 - on the Moon, 264–272
 - theory, 7, 165, 273, 284, 290
 - values, 114, 174
- prosperity, 138, 140, 151, 163, 174
- protectionism, 309, 317
- protections, 166, 168, 208–210, 212, 256, 259–262, 267
- protocols, 49–50, 192, 210, 315, 317
- providers, 45–47, 50–51
 - housing, 164, 169, 175
 - referral, 47, 52
 - service, 45, 49, 51, 158, 171, 191, 209, 213
- proximity, 98, 230, 286
- public
 - benefits, 105, 261
 - domain, 4, 117, 256
 - goods, 3, 18, 105, 177–178, 193
 - vs CPRs (common pool resources), 242–243
 - guardians, 286, 288
- public housing, 7, 79–85, 88
 - and alternative uses of unbuilt spaces, 85–87
 - application of commons theory, 83–84
 - assets, 7, 80–81
 - bases for claiming a stake in decision-making, 84–87
 - rights to participation and information, 87
 - in transition, 80–83
 - urban, 79–88
- public
 - information, 45–46
 - interest, 171, 260–261, 271, 279
 - officials, 83, 95, 151, 160, 171
 - parks, 156, 284, 287
 - resources, 34, 79, 120, 123, 271
 - spaces, 4, 9, 40–41, 83, 132–135, 139, 148–151, 162, 166
 - co-design, 148–149
 - trees, 114, 119, 121
 - trust, 12, 65, 281–282
 - doctrine, 8, 12, 105, 264–265, 271–272
 - obligations, 278–279, 281
- public-community partnerships, 126, 129
- public–private partnerships, 7, 83, 85, 87, 132
- punishment, 295, 299–301
 - payoffs, 300–301, 303, 307
- qualitative interpretation, 217, 223
- quality of life, 30, 108, 139–140, 244
- Quarta, Alessandra, 127
- questionnaires, 130, 206, 216, 221, 223
- quintuple-helix approach, 139–140, 143
- race-based affirmative action, 12, 284–285
- racial discrimination, 289
- racial diversity commons, 287–289
- RAD (Rental Assistance Demonstration), 85–87
- rainfall, 59, 217, 256
- Rajasthan, 206–207
- ranking of outcomes, 66–69, 73–75
- Raspail, Jean, 28
- rational choice theory, 90, 93
- rationality, 93
 - individual, 218, 225
- rats, 58, 243
- raw sewage, 11, 246–247
- real estate, 60, 118, 167, 169–170, 197, 286
- recentralization, 227, 236
- reciprocity, 97, 125, 172, 219, 279
- reclamation, wetlands, 11, 242–243, 250–251
- recognition, 11, 41, 176, 222, 256, 260–261, 268
 - legal, 9, 124
- reconstructed commons, 251
- recreation, 114, 117, 136, 259–261
- reduction targets, 190–191
- referral providers, 47, 52
- reform, 18, 82, 232
- regeneration, 8–9, 126, 129–130, 132–134, 136, 143
 - urban, 132–134, 136
- registration, 51, 182–183, 185, 231–232, 239, 276
- registries, service, 50–51, 53
- regulation, 12, 56–58, 126–131, 134–136, 181, 262, 264
 - government, 7, 32, 56, 59, 61–62, 64–65, 80, 90, 156
- regulators, 113, 183, 274
- regulatory
 - commons, 12
 - biotechnology, 273–283
 - critical analysis, 274–278
 - frameworks, 10, 80, 83–85, 176, 183, 264
 - gaps, 282–283
 - race, 8, 126
 - regimes, 10, 105, 176, 181, 183, 186–187
 - slippage, 79, 82, 88, 157, 162
- rehabilitation, 11, 84, 175, 246–247, 251
- relationships, 22, 66, 97–98, 102–103, 157–158, 161, 163, 170–171, 300–303
 - social, 165, 207–208
- reliance, 92, 97, 99, 166, 280–281
- religion, 27, 29, 37, 94, 176, 178
- renewable energy, 68, 71, 73–74, 191
- renovations, 83, 85–86, 134
- Rental Assistance Demonstration 85 *see* RAD.
- renters, 117, 121, 169–170, 290
- repeated games, 295, 299, 307
- representation, 9, 146–147, 156–157, 159, 161–163, 230, 239
 - and BIDs (Business Improvement Districts, 159–160
- reproduction, 27, 32–33, 35, 38, 279
- reproductive rights, 27, 31, 33
- resale prices, 169, 172
- research, 1–2, 53–54, 128, 130, 180–181, 215, 245, 248

- empirical, 21, 97, 151, 180, 217, 223, 297
- questions, 5, 189, 200
- resettlement, 39, 206
- residents, 5, 7, 80–88, 116–118, 121–122, 161–163, 168–170
 - associations, 162
 - city 79, 113, 126 *see* inhabitants, city
- resilience, 89–90, 119, 220, 225, 312
- resistance, 4, 117, 122, 227, 236
 - social, 91, 93–95, 97, 99
- resource data, 6, 45–46, 48–54
 - anti-commons, 48–49
 - commons, 54
 - polycentric, 49–50
 - exchange, 46, 50
 - maintenance, 47, 54
 - production, 49–50
- resource depletion, 60, 65
- resource directories, 45–54
 - data, 51, 53
- resource efficiency, 188–190, 192, 196
- resource management, 10, 55, 57, 59, 63–64, 162, 165, 278, 280
 - common, 41–42
 - decisions, 7, 55–57
 - localized biocultural, 278, 280
 - natural, 22, 27, 227, 239
 - problems, 56, 108
- resources, 1–3, 20–21, 56–58, 62–65, 104–107, 165–167, 207–209, 242–243, 267–269, 290–291
 - aid, 8, 90–91, 96, 99
 - associated, 236, 240
 - availability, 56, 58, 61, 149
 - collective, 4, 116, 125, 240
 - common 8 *see* common resources.
 - common-pool 6 *see* common-pool resources.
 - directories 45 *see* resource directories.
 - environmental, 7, 222, 224
 - human, 90, 224
 - land, 34, 36, 38, 93, 171–172
 - livelihood, 235–236, 241
 - losses, 59, 63, 312
 - natural 3 *see* natural resources.
 - open access, 1–3, 103, 106, 269
 - planetary 265 *see* planetary resources.
 - public, 34, 79, 120, 123, 271
 - use, 10, 189, 221
 - users, 1, 56, 62, 165, 230
- responsibilities, 12, 52, 129, 141, 158, 161, 175, 194, 226, 238
- responsiveness, 230, 303
- restorative justice, 275, 278, 283
 - failures, 276–278
 - under Hawai'i Constitution, 278–280
- revenues, 46, 51, 82, 84, 86–87, 230, 232–233, 237, 239–240
- reverse discrimination, 284, 291
- revitalization, 159, 242, 251
- rights, 1–2, 21, 24, 62, 104–105, 219–220, 231–232, 256, 262, 286
 - of access, 24, 271
 - to alienate, 21, 268
 - appropriate, 255, 258–260, 262
 - bundles, 21, 105
 - collective, 11, 41, 136, 228
 - of exclusion, 2, 286, 291
 - human, 27, 167, 178, 314, 317
 - private property, 2, 4, 39, 41, 56, 62, 166, 173, 267
 - reproductive, 27, 31, 33
 - riparian, 256–257
 - to use/of use, 12–13, 24, 105, 126, 255–256, 262, 291
 - water, 255–259, 262
- riparian ecosystems, 260, 262
- riparian forests, 216, 218
- riparian rights, 256–257
- risks, 21, 69, 137, 230–231, 265, 267, 282, 284, 286
 - compromising cooperation, 13, 295
- rivalry, 60, 63, 65, 72, 269
- rivers 216, 218–219, 222, 225, 246–248, 256, 261 *see also* *individual river names*
- roads, 105, 107, 116, 125, 221
- robustness, 220
 - of common-property regimes, 295–306
 - of democracy, 181
- rules, 20–22, 24, 90–91, 94–95, 101–102, 182–186, 219–220, 222, 224–225, 314–317
 - boundary, 20, 24, 101, 183
 - choice, 20, 183, 221
 - collective, 218, 223
 - constitutional, 101, 221
 - enforcing, 195, 233, 281
 - followers, 22, 24
 - formal, 199, 241
 - institutional, 96–99
 - makers, 22, 24
 - new, 99, 101–102, 183–184, 219, 235, 241
 - operational, 62, 101, 221
 - permissive, 182–187
 - restrictive, 184, 187
 - structures, 8, 101–104, 107–108
 - of thumb, 211, 214
 - typology, 21, 24, 182–183
 - working, 169, 185–187
- rules-in-form, 182–187, 197
- runoff, agricultural, 243, 246
- Russia, 186, 267
- safe spaces, 288–289
- safety, 29, 64, 82, 149, 229
- Sakroda, 207, 212
- sanctions, 62, 74, 168, 183, 189, 220, 222
 - graduated, 62, 90, 199, 220, 304
- Sangawas, 211–212
- São Paulo, 9, 139, 146, 148
- scarcity, 117, 138–139, 167, 207, 221, 256, 261
- Schaller, Susanna, 159
- School of Dreams, 140–141, 143–144
- security, 13, 103, 158, 241, 256–257
 - national, 311, 314
- sedentarization, 35–39, 41
 - processes, 34, 39
- seed companies, 276–277, 280, 282–283
- seed crops, 12, 276

self-correction, spontaneous, 316–317
self-governance, 10, 56, 164, 174, 180, 182
self-governing institutions, 2, 204
self-interest, 1, 189, 219, 245, 258, 269, 285–286, 288
self-management, efficacious, 165, 175
sequestration, carbon, 103, 119
Sergipe, 9, 141
service information, 46, 51
service providers, 45, 49, 51, 158, 171, 178–179, 191, 209, 213
service registries, 50–51, 53
services, 45–48, 51, 104–105, 107, 119, 126, 137, 178–179, 182, 313–315
 ecosystem, 114, 120, 261
 local, 138, 157, 163
 social, 6, 45, 47–48, 51, 81, 143, 158
settlements, 39–40, 82, 138, 221, 235, 247–248, 262, 267
Seva Mandir, 207–210, 212
sewage, raw, 11, 246–247
SHAKA Movement, 277, 282
Share Baltimore, 174–175
shared
 activities, 178
 benefits, 104, 107
 environment, 88
 goals, 2, 5–6, 190, 199, 244
shifting baselines, 58, 65
shirking, 194, 197, 199–200
shocks, 240
side payments, 74–75
sidewalks, 116, 119–120, 134, 149, 158, 161–162, 166
Sierra Leone, 93, 95, 97–98
SIREN Report, 47
skills, 85, 135, 149, 180
 digital, 132, 135
slippage, regulatory, 79, 82, 88, 157, 162, 186
social
 behaviors, 35, 37
 benefits, 83, 169, 194, 232–234, 236, 239–240
 cohesion, 144, 149, 172, 228
 communities, 156, 244
 cooperation, 125, 127
 development, 4, 35
 dilemmas, 1–3, 7, 20, 22, 24, 66–67, 91, 166, 220
 environmental dilemmas, 216–225
 evolution, 6, 34, 41
 functions, 7, 84–85, 131
 incentives, 6, 34, 37
 inequality, 229, 289
 innovations, 135–136
 interactions, 11, 19, 37, 86, 104, 139, 141, 149, 152, 245
 justice, 98, 147, 159
 norms, 5, 11, 37, 85, 185, 231, 241
 outcomes, 11, 126, 232, 312
 processes, 4, 104
 relationships, 165, 207–208
 resistance, 91, 93–94, 97, 99
 services, 6, 45, 47–48, 51, 81, 143, 158
 structures, 34, 38, 41, 122
 trust, 11, 199, 226, 229–230, 232
 welfare, 171–172, 175, 193–194

societal benefits, 102, 121, 258
socio-ecological outcomes, 11, 230
sociopolitical outcomes, 181, 186
soil, 114, 120, 248, 256, 261, 304
 conservation, 207
 erosion, 57, 209, 279
solidarity, 125, 138, 151, 173, 225, 228, 235
solutions, 2–3, 7, 13, 31–32, 54, 56, 73–74, 218–219, 265–266
 institutional, 95, 205
South Africa, 227, 234
Southern Africa, 11, 266
sovereignty, 266, 311
 cyber, 313
space
 development, 12, 271–272
 legal framework, 266–270
 outer, 12, 264–272, 306
 treaties, 264, 268–269
spaces, 4, 122–123, 130, 132, 136–137, 144, 155–157, 161–163, 265–268, 272
 architectural, 138–139, 151
 green, 59, 86, 113, 119, 129, 245, 286, 288
 open, 39–40, 86, 107, 127, 149, 242, 245, 251
 for people and nature, 243–245
 public, 4, 9, 40–41, 83, 132–135, 139, 148–151, 162, 166
 safe, 288–289
 territorial, 155–157, 163
 unbuilt, 83, 85–86
 urban, 40–41, 79–80, 85, 105, 157, 162, 167
speculation, 167, 257–258
speculative market, 9–10, 164
sponsoring organizations, 196–197
Sri Lanka, 2, 180
stability, 5, 37, 94, 169, 221, 259
Stag Hunt, 7, 66–69, 71–75
stakeholders, 53–54, 117, 119, 169, 171, 189, 191–192, 316
 multiple, 9, 130–131, 135–136, 158, 165, 169, 311–312, 317
standards, 47, 168, 183, 194, 222, 283, 310, 315–316
 district, 192
 open, 46, 50
 stringent, 199–200
state
 agencies, 258–261
 control, 104, 107, 227, 311
 courts, 12, 276, 281–283
state-CSO relations, 181–182, 186–187
status, legal, 184, 237
statutory schemes, 80, 275–276
stewardship, 9, 53–54, 60, 88, 126, 165, 169–170, 172–175
storm surges, 87, 114, 120, 248
strangers, 5, 55
 genetic, 37, 41
strategies, 36–37, 41, 70–71, 198–199, 207, 212, 295, 299–300
 dominant, 68–73
streamflow, 260–262
streams, 11, 232, 245–248, 256–257, 259, 261–262, 279
 dewatering, 12, 259, 261
 polluted, 242, 251
street trees, 8, 113–114, 116, 119–120, 166
street vending, 161, 166

- streets, 114, 116, 119, 121, 132–135, 140, 156, 160, 166
 Strict Coordination, 71–72
 structures, 4, 21–22, 100–101, 105, 107, 166, 168, 221–222
 governance, 101–102, 117, 170–171, 175, 204, 311
 institutional, 46, 168, 194, 200
 rule, 8, 101–104, 107–108
 social, 34, 38, 41, 122
 tribal, 34, 36, 38–39, 41
 students, 13, 19, 21, 149, 284–285, 287–291
 Latino graduate, 287, 289
 minority, 13, 285, 289–291
 non-minority, 287–289
 sub-Saharan Africa, 92, 98, 226, 228, 239–241
 substantial equivalence, 12, 274, 280, 283
 subtractability, 8, 177–178, 187
 success, 169, 171, 211–213, 219, 223, 227, 239–241, 312
 evaluation, 214, 228
 long-term, 228, 306
 sulfur oxides, 114, 120
 Sundarcha, 210, 212
 supplies, 49, 53, 178, 185, 221, 262
 water, 104–106, 221, 256, 259, 262–263
 support, 5, 34, 129, 143–145, 149–150, 209–210, 228, 260–262, 290–291
 survival, 35–36, 38, 125, 128, 138, 211
 genetic, 35–36, 39, 41
 sustainability, 50–51, 80, 82, 136–137, 166, 168, 172, 174, 199
 urban forest, 117–119
 sustainable
 commons, 24, 37
 development, 90, 129, 314
 management, 6, 35, 297
 swaps
 middle, 71
 payoff, 66–67, 69, 71–72, 76
 Sweden, 185
 Switzerland, 2, 180, 295, 305
 symmetric games, 69–70, 72, 75
 synergies, 71, 181, 240
 institutional, 228, 241
Syngenta Seeds, 275–276, 282
- tangible commons, 63–64
 Tanzania, 11, 226–229, 239–240
 and Namibia compared, 232–239
 targets, planning, 190
 teams
 architecture, 143–146, 148
 architecture-facilitation, 148–151
 technical capacity, 90, 95–96
 technological change, 73, 295–306
 effects, 13, 296, 300–301
 and incentives, 297–303
 and tragedy of the commons, 298–299
 technological improvements, 296–298, 301–305
 and incentives to cooperate, 301–303
 major, 13, 295–296, 298, 301–303, 305
 minor, 13, 295–296, 298, 302–303, 305
 technological progress, 13, 295, 303, 306
 technology, effective, 296–297, 304
- temporal commons, 7, 55–65, 104
 accounting for, 64–65
 and primary commons management strategies, 59–62
 reasons for devolution into tragedy, 63–64
 temporary moratoria, 275, 277, 282
 tenants, 5, 80, 83–85, 190
 tensions, 7, 9, 34, 90–93, 95, 97–98, 103, 158, 239
 space-based, 155, 159
 tenure, land, 9, 164, 221, 227, 236–238, 240
 territorial spaces, 155–157, 163
 threats, 39, 56, 59, 74–75, 94, 97, 229, 233, 261–262
 Thunberg, Greta, 65
 ties
 blood, 6, 34, 37, 40–42
 cultural, 231
 time, role in commons tragedies, 56–59
 tools, 10, 22, 50, 127, 134, 181, 189, 192, 195, 200
 analytical, 9, 18–19, 23, 102
 infrastructural, 6, 52
 legal, 128, 134
 Toronto, 158–160, 162
 tourism, 240, 267
 eco-tourism, 226, 232–233, 236, 239–240
 tourist/lodge operators, 229, 232, 236, 239
 tradable development credits, 271–272
 tradable development rights, 12, 265
 trade, 104–105, 309, 313, 317
 negotiations, 13, 310
 tradeoff conflicts, 11, 231
 traditional
 commons, 63, 65, 166
 institutions, 92, 204
 leaders, 237, 239
 systems, 39, 93, 169, 205
 tragedy of the commons, 22, 90, 156, 165–166, 176, 180, 219, 296
 see also *Introductory Note*.
 and technological change, 298–299
 ‘Tragedy of the Commons, The’, 1, 6, 26–33
 tragic anti-commons, 48–49
 tragic conditions, 22, 220, 269
 trails, hiking, 247, 250
 training, 97, 129, 135, 175, 179, 203
 transaction costs, 102–105, 229, 259
 transfers, 21, 24, 83–85, 87, 226, 258–260, 276, 279
 transformations, 4, 7, 66, 69–70, 72, 74–75, 148, 287, 289
 potential, 66, 72, 75
 transitions, 37–39, 68, 71, 73, 79–80, 84, 88, 136, 296
 transparency, 85, 94, 160, 175, 230, 233, 238, 278
 treaties, 71, 264–268, 270, 297, 312
 trees, 8, 11, 58, 61, 113–121, 244, 248, 250
 canopy, 115–116
 private, 114, 116, 119–121
 public, 114, 119, 121
 street, 8, 113–114, 116, 119–120, 166
 urban, 8, 113–115, 117, 120–121
 tribal societies, 34, 36–37, 41
 tribal structures, 34, 36, 38–39, 41
 tribes, 34, 36–40, 208
 trophy hunting, 226, 232, 240

- trust, 37–38, 53, 97, 108, 168–170, 222–223, 225, 229–230, 235, 278–279
 - building, 199, 244, 310, 317
 - public 12 *see* public trust.
 - social, 11, 199, 226, 229–230, 232
- trusts, 9, 53, 61, 164–165, 173 *see also* individual trust types.
 - data, 50, 52–53
- Turkey, 2, 180
- typologies, 9, 129, 179, 185
- Ubeshwar Vikas Mandal 207 *see* UVM.
- Udaipur, 207–209
- UEAALDF (United for Equality and Affirmative Action Legal Defense Fund), 291
- unappropriated water, 257–258
- unbuilt spaces, 83, 85–86
- underinvestment, 299–300, 303
- underutilization, 48, 262, 273
- United for Equality and Affirmative Action Legal Defense Fund 291 *see* UEAALDF.
- United Nations Declaration on the Rights of Indigenous Peoples, 283
- United States, 12, 29, 243, 248, 261, 266–267, 274, 287, 291, 309–310
 - cities, 167 *see also* individual cities.
- upward and downward accountability, 227
- urban
 - areas, 11, 34, 97, 114, 158, 245, 251, 259
 - assets, 3, 8–9, 79, 136
 - canopy, 106, 113–123
- urban commons, 4–5, 8–9, 120–121, 124–130, 135–137, 140, 151–152, 161–163
 - analysis, 80, 88, 122, 163
 - architecture, 138–152
 - steps, 142
 - and Business Improvement Districts (BIDs), 155–163
 - conceptualizing, 156–157
 - framework, 7, 80, 124, 163
 - and BIDs (Business Improvement Districts), 161–163
 - theory, 80, 88, 113, 115–116
 - towards empirical analysis, 124–129
- urban
 - communities, 37, 125
 - creativity, 129, 134–135
 - environments, 17, 37, 140–141, 242, 245
 - forest ecosystem, 113, 116
 - forestry, 113, 115, 119–122
 - forests, 8, 113–114, 116, 122–123
 - benefits, 114–116
 - limits of NYC’s existing vision, 119–121
 - what commons perspective adds, 121–122
 - governance, 117, 121, 139, 141, 157, 161
 - infrastructure, 1, 126
 - knowledge, 7, 85
 - public housing, 79–88
 - regeneration, 132–134, 136
 - residents, 79, 113, 126
 - spaces, 40–41, 79–80, 85, 105, 157, 162, 167
 - trees, 8, 113–115, 117, 120–121
- urbanization, 8, 34–35, 38, 41, 114
 - processes, 6, 34
- use
 - energy 8 *see* energy use.
 - land, 157, 167–168, 170, 237, 284
 - of natural resources, 22, 228
 - rights to/of, 12–13, 24, 105, 126, 255–256, 262, 291
 - water, 10, 188, 199, 221, 231, 255–258, 262
 - wildlife, 233–234, 239–240
- user reality, 222
- users, 53, 63–64, 106–108, 157, 193, 216–225, 257, 269–270
 - groups, 5, 103, 221, 264
 - real, 224–225
 - resource, 1, 56, 62, 165, 230
 - water, 11, 221, 256–259, 262
- utilities, 4, 23, 51, 88, 107, 157, 172
 - data, 50–51, 53
- UVM (Ubeshwar Vikas Mandal), 207–209, 212
- Vaccaro, Ismael, 17–18, 23
- valuations, 53, 297, 301
- value, economic, 102–103, 105–106, 116, 221
- values, 27–28, 115–121, 125–126, 286, 295–307
 - land, 5, 168, 170
 - property, 114, 174
- vested interests, 57–58, 156
- vetos, 74, 276, 291, 303
 - antiproperty, 290
- viability, 53–54, 211, 228, 230, 233
- Village Councils, 210, 235–236
- villagers, 211–212, 233, 235
- villages 10, 141, 204, 206–207, 209–213, 232, 235 *see also* individual village names
- violence, 94, 231, 241
- voluntary goals, 10, 189
- volunteers, 48, 106–107, 177–178, 182, 315, 317
- vulnerable communities, 99, 123
- vulnerable people, 79
- Waiāhole, 279, 281
- walled gardens, digital, 313, 316
- Washington, 1, 5, 125, 160, 244, 262, 288
- waste, 60–61, 67, 222, 246–249, 255, 258
 - human, 243, 266
- wastewater, 11, 243, 247, 249–250
- water, 188–191, 221, 226, 228, 231, 234, 245, 248, 255–262
 - availability, 221, 261
 - diversion devices, 13, 295–296, 298, 305
 - legislating and enforcing minimum flows and levels, 261–262
 - management, 217, 220
 - quality, 114, 248–249
 - rights, 255–260, 262, 279
 - supplies, 104–106, 221, 256, 259, 262–263
 - unappropriated, 257–258
 - use, 10, 188, 199, 221, 231, 256–262
 - users, 11, 221, 256–259, 262
 - wastewater, 11, 243, 247, 249–250
 - wells, 34, 38
- watershed development, 203, 205, 207
- wealth, 8, 28, 128, 173, 221, 234, 265
 - potential, 265, 269

- web-based approaches, 47–48
- welfare
 - social, 171–172, 175, 193–194
 - state, 27, 31
- wellbeing, 125, 129, 167, 245
- wells, water, 34, 38
- West Africa, 8, 90–99
- wetlands, 56, 59, 64, 242, 248–251
 - constructed, 243, 248–250
 - reclamation, 11, 242–243, 250–251
- Wikipedia, 47, 106–107
- wildlife, 11, 226–229, 232–233, 235–236, 238–241, 248, 259–261
 - economic benefits, 232, 235
 - numbers, 229, 240
 - social benefits, 232, 234
 - use, 233–234, 239–240
- Wildlife Management Areas 229 *see* WMAs.
- win-win equilibrium, 7, 71
- WMAs (Wildlife Management Areas), 229, 232–233, 235–236
- women, 1, 32, 97, 132, 178, 235
- working rules, 169, 185–187
- workshops, 132, 144–146, 149
 - co-design, 144, 146–147
- Zambia, 226–227
- Zimbabwe, 226