access, components, 141
actor-based models, 37
actors, 34, 37, 38
  purposive behavior, 64
adaptation, to climate change
  impacts, 153
adaptionist approaches, 36
adaptive approach, 106
adaptive governance systems, 134
adaptive management, 94
aerial photography, 74, 77, 84, 88, 100
  see also remote sensing
aerial videography, 86
aerosols, build-up, 109
Africa, climate change vulnerability, 156
agency, human, 34–6, 137
agent-based models (ABMs), 89–90, 120–1
  of complex systems, 120–4
aggregation, 98, 103, 106
agriculturalists, 44
agriculture
  commercialization, 43
  industrial, 15
  intensification, 3–4, 6
  land devoted to, 7
  sustainability, 155
  transformation to, 2
  unsustainable practices, 43
agroecology, 98
agrotourism, 152
air pollution, 94, 150
alfisols, 79
Altamira region, 80
Amazon region
  deforestation, 77–83
  fires, 13
  household composition, 81
  land change, 79
  land cover changes, 81, 102
  soil pH indicator, 104
  urbanization, 85
analytic-deliberative process,
  stakeholder involvement, 129
analytic hierarchy process, 130
anthropogenic impact, 56
anthropology, remote sensing in, 74
anti-chaos, 115
appropriation rules, 133
AQUA, 99
armed conflict, increase in, 8
artificial intelligence, 42, 64, 140
Asia
  logging, 141
  reforestation, 59
Association of American Geographers,
  44
Atlantic Thermohaline Circulation
  (THC), 11
atmosphere, biogeochemical
  changes, 5
atmosphere–ocean model, 109
taggit-based decision making, 138
Australian aborigines, 47
Austria, 109
AVHRR sensor, 98–9

Balée, W., 36
Baltimore LTER, 152
Bangladesh, 156
behavioral decision-making research, 129
behavioral decision theory, 130
behavioral economics, 138
behavioral models, 89
behavioral organization theory, 130
Belem–Brasilia highway, 78
belief formation, 137
Bennett, J., 65–6
biocomplexity, 112–15
  conclusions, 124–5
  hierarchical modeling, 124
  processes of, 118
see also agent-based models;
  spatially explicit processes
biodiversity, 6
  habitat destruction/fragmentation
  and, 116
  issues, 98
  loss, 67
  as priority, 62
  valuation, 148
biological ecology, 49
Biome 300 program, 35
birth rates, 8
  changes in, 28–30
Boserup, Ester, 26, 34
Botswana, migration, 34
bounded rationality, 130
Brazil
  cattle ranching, 44, 79–80
  hyperinflation, 78
  Program of National Integration, 78
see also Amazon region
bridging organizations, 134
buffering techniques, 87
California, University of, 112
Cambodia, 156
capitalism, 43, 45
carbon capture, 147
carbon dioxide
  emission ceilings, 110
  increase in levels, 7, 8, 11–12
carbon sequestration
  clean air and clean water in, 62
  technologies for, 147
carbon stocks, above-ground, 104
carbon trading, 110
cars, reduction in number, 151
  cattle ranching, 44, 79–80
  cause and effect, 39, 47, 48
CBERS, 99
cellular automata (CA), 88, 119, 121
  hierarchical model, 124
censuses, limitations, 32
Center for Spatially Integrated Social Science (CSISS), 76
Center for the Study of Institutions, Population and Environmental Change (CIPEC), 97
central place hierarchy, 27
certainty, 41
Chayanov, A.V., 31
Chicago School of Human Ecology, 85
chiefdoms, 4
China
  panda habitat, 119–20
  Pearl River delta region, 152
  reforestation, 59
  cholera, outbreak in London, 72, 73, 76
cities
  definition, 84
  ecology of, 150–1
  greening, 151
  rise, 5
  and sustainability science, 149–52
Clements, F.E., 51, 54
climate change
  effects, 11–13
  socioeconomic change and, 146–7
  and sustainability, 153–6
climatic variability, impact on populations, 74
climax, 51
clines, 51
closed systems, 64
Club of Rome models, 109
CLUE model, 92
coal, 5
coastal flooding, 156
cognition, 90, 122, 146
cognitive dissonance, 40
cognitive heuristics, 137
Coldwell, Rita, 112
collective action, 131–4
collective-action theory, 38
co-management, 94
commodity price cycles, 81
common good, individualism vs., 8
common-pool resources (CPRs), 38, 94, 132–4
competition
  between species, 116
  in succession, 56
complex adaptive systems, 132
complex systems, mathematical models, 127
complexity, 67, 97
organizational, 114
  sources in land-use systems, 120
  spatial, 114
  temporal, 114
see also biocomplexity
complexity theory, 113, 119, 144
confidentiality, 70
conflict-resolution mechanisms, 134
connectivity, 59–61
  organizational, 113
Connell, J.H., 52
consumer behaviors, 136
consumption
  developing countries, 39
  emphasis on, 6
  environmentally significant, 145–6, 153
  individual, 135
  population and, 6
consumption habits, population growth and, 8
contagion, 152
contingent valuation, 128
continuous cultivation, 79
contracts, 42
control sequences, 40
cooling technologies, 147
core countries, 43
corridors, 59–60
cost-benefit analysis (CBA), 127
coupled human–natural systems, 114, 118–19, 149, 157
  research foci, 124
Coupled Natural Human Systems Program, 112, 118
credit, availability, 33–4
crime, 150, 152
crisis, 134
critical theory, 45
crop choice, and soil quality, 82–3
cross-scale interactions, 94–5, 149
crowding, 150
Cuiabá-Santárem highway, 78
cultivation, continuous, 79
cultural ecology, 46–8, 64
  ecosystem vs., 66
cultural evolution, 137
cultural studies, 45
Cultural Survival Quarterly
  cultural values, conflicting, 8
cyclones, tropical, 155–6
Darwin, Charles, 50
data collection
  approaches, 23
  longitudinal, for population and environment study, 32–3
data methods, approaches, 23
David, J.L., 124
death rates, changes in, 28–9
debt-for-nature swaps, 110
decentralization, 142
decision making see environmental decision making
decision-theoretic approaches, 37–42
deforestation, 7
causes, 80, 96–7
driving forces, 80, 96–7
economic factors affecting, 43–4
issues engagement approaches, 98
spatial considerations, 28
transition to reforestation, 57–9
demographic data, 103
demographic transition theory, 28, 30
dependency theory, 42
design principles, 133–4
deterministic chaos, 115
differential global positioning system (DGPS), 77
disaggregation, 98, 101
disciplinary biases, overcoming, 24
diseases, vector-borne, 155
distributed assessment systems, 95

diversity
cultural, 6
see also biodiversity
domestication, 2
drought, 139, 152, 155
dynamic equilibrium, 67
dynamic modeling, 64
dynamic systems models, 88, 121

ecological economists, 37
ecological footprint, 150
ecological systems, as economic systems, 144
economic man, behavior of, 41
ecosystem goods and services, 62, 148

ecosystems
concept, 63
in biology, 63–4
in social sciences, 64–7
cultural ecology vs., 66
integrated study of people in, 68
large-scale vs. micro-scale, 96
response to stress, 63
restoration, 98
top-down vs. bottom-up control, 53–4
Ecuador, deforestation, 78

Ecuadorian Amazon
coupled human–natural systems, 121
migration, 32
edge effects, 59–60
El Niño events
forecasting, 16
frequency, 13
emergent phenomena, 115, 118, 149
endogamy, 3
energy consumption, 10, 136, 138, 153
energy efficiency, 155
energy flows
global, 109
measurement, 67
energy-industry model, 109
enforcement, 42
England, southeast, drought, 139
environment, population and, theories, 30–4
environmental decision making, 126–42
access to, 141
appropriate level for, 140
conclusions, 140–2
conflicting values, 126, 129
evaluation criteria, 137
individual behavior and, 134–6
institutional analysis, 131–4
social context and, 136–40
structural complexity, 126
time horizons, 127
understanding of, 146
environmental decision support systems (EDSS), 139–40
environmental economics, 37
environmental history, 118
environmental protection, support for, 135
environmental psychology, 39, 138
Environmental Security and Vulnerability group, 20
environmental treaties, 140–1
EPA, 129
equilibrium, emphasis on, 98
equilibrium models, 67
equilibrium resets, 114
equilibrium theories, 61
Erickson, C., 36
EROS, 99
ethnography of landscape, 77
Europe
and greenhouse gas emissions, 8
land-use dynamics, 91–2
reforestation, 59
urbanization, 92
European Union, enlargement, 91
eutrophication, 15
“even swaps,” 130
evolution
by natural selection, 50
of cooperation, 115
role in shaping ecosystem, 114
evolutionary ecology, 37
exogamy, 3, 47
expected utility, maximization, 41
expected utility model, 137
experimental economics, 130
experimental methods, 90, 122
extinction debt, 116
Exxon Valdez oil spill, 128
facilitation, 56
famine, 2, 155
farm/household level, 101, 103
farmers
consumers and, 152
pastoralists and, 4
farming see agriculture
fertility rate
decline causes, 38
trends by regions, 30, 31
fertilization, increase, 9, 15
fertilization effect, 155
field view, 73
Finite World model, 109
fires, 13
fishing
open-access, 38
stock depletion, 7
flood, 155
flooded forest, 100
floristic composition, 104
floristics, 56
fogs, 6
food, and cultural/belief systems, 15
Food and Agriculture Organization (FAO), 58
food markets, world, 43
food production, effects of increasing, 15
foraging, 44, 77
forest access, 125
forest dynamics, 59, 90–1
forest islands, peri-village, 77
forest transition, 56–8
Forest Transition Theory, 57, 58
Forum on Science and Innovation for Sustainable Development, 144
fossil fuels, 5–7
frontier areas, 32, 123
fundamental niche, 52
fuzzy set theory, 131
gap models, 91
GCMs, 16, 108–9
Geist, H.J., 96
general equilibrium models, 43–4
genetic engineering, 155
geographic information systems see GIS
geographic resolution, 109
gereferencing, 71, 103, 105–8
GIS, 71–2
appearance, 72
GIScience vs., 71
in humanities, 76
misaligned data correction, 124
modeling and, 88–92
in multidisciplinary research, 98, 108
remote sensing and, 74–7
case studies, 77–83
in social sciences, 75
GIScience, 71, 72, 76
glacial melt, 155
Gleason, H.A., 51–2
Global Change Biology, 110
global circulation models (GCMs), 16, 108–9
global environmental changes, characterization, 7–15
global level analysis, 108–10
global positioning system (GPS), 70, 71, 103, 105, 108
global processes, 1
globalization, economic, 141
Goody, J., 31
Google Earth, 86
GPS, 70, 71, 103, 105, 108
graded boundaries, 67
green labels, 135
“green revolution,” 26
greenhouse gas emissions computation, 109
dealing with in radical way, 155
household energy consumption contribution, 153
IPCC call to reduce, 14
grid cells, 93
groping, 40
Gross Domestic Product (GDP), increase, 9–11
group decision-making, 129–30, 146
group selection, 67
GTAP, 91
Guinea, savanna environment, 77
habitat destruction/fragmentation, 15, 115–16
and biodiversity, 116
happiness, income and, 143
Hardin, G., 38
Harvard Forest, 150
HDP, 17–19
heat stress, 155
hedonic prices, 130
herbivores, 53, 54
heterogeneity
endogenous, 90
exogenous, 90
spatially explicit, 113–14
hierarchical modeling, 124
hierarchical patch dynamics paradigm, 124
hierarchy theory, 113, 124
Himalayas, 155
historical ecology, 35–6, 118
history
in coupled natural human systems, 113
human and earth system, 35
holism, 64, 113
homeostasis, 63, 66–7
horticultural populations, 6
host–parasite analogy, 151
household level, 101, 103
household life cycle, 31, 81
households
GIS and remote sensing in studying, 81–3
transformations in urban areas, 86
Hubbell, S.P., 52
human adaptability research, 65
human dimensions
agenda development history, 16–20
research characteristics, 20–2
Human Dimensions Program (HDP), 17–20
Human Ecology, 75
human environment interaction, research questions, 18
human process variables, trends, 9–11
human psychology, and understanding behavior, 39
humans, and nature, dichotomy between, 9
hunger, reducing, 145
hunter-gathering (HG), 2–4, 44, 46–7
hunting, impact in forest ecosystems, 53–4
Hutchinson, G.E., 52
hybrid vehicles, 136
IAMS see integrated assessment models
Ifugao, 71, 74
IGBP, 16–19, 35
IHDP, 20
IHOPE studies, 35
IKONOS, 74, 85, 99
IMAGE, 91, 109
image analysis, 106–8
image classification techniques, 84, 107
*Imperata brasiliensis*, 104
income, and happiness, 143
India
  common-pool resources management, 133
  reforestation, 57
Indiana University, 97
indigenous systems, intensification, 100
individual behavior
  drivers, 138
  and environmental decisions, 134–6
individualism, 37
  common good vs., 8
Indonesia, agriculture, 47
induced innovation, 27
industrial revolution, 5
influence diagrams, 131
information
  access to, 141
  collection, 137
Inglehart, Ronald, 143
inheritance, 2–3
inhibition, 56
initial floristics, 56
innovations
  diffusion of, 2
  induced, 27
institutional analysis, 131–4
Institutional Dimensions of Global Environmental Change, 20
institutions
  cross-scale linking, 94
  definition, 133
  dynamic processes of, 66
  mediating role, 124–5
  shaping of resource use by, 146
insurance markets, failure, 33–4
integrated assessment models (IAMs), 96, 108, 109, 139
integrative science, 22–4
integrative systems approach, 125
intelligent agent-based models, 42, 64, 66
interdisciplinary research, 145
Intergovernmental Panel on Climate Change (IPCC), 14, 109
International Biological Program, human adaptability research, 65
International Geosphere-Biosphere Programme (IGBP), 16–19, 35
International Human Dimensions Program (IHDP), 20
International Institute of Applied Systems Analysis (IIASA), 109
International Social Science Council (ISSC), 16
irrigation, 5, 7
irrigation terraces, 71
island biogeography, 59–61
ISSC, 16
Ituri Forest, 100
Japan, 15, 84, 154, 155
Kalahari Bushmen, 47
keystone species, 62
Kickapoo Valley, 76
Kilimi, 77
  kin selection, 67
Kissidougou, 77
Knowledge Network for Biocomplexity, 112
Kyoto Protocol, 8, 104, 140–1
La Niña events, forecasting, 16
Lambin, E.F., 96
land-cover, in urban context, 83–8
land-use
  drivers, 138
  history, 107, 121
  intensification, 74
  succession, 152
land-use and land-cover change (LUCC)
  classification, 87–8, 107–8, 110
  core project, 19
  drivers, 138
  multi-agent system models (MAS/LUCC), 123
  multilevel analysis, 101–3
  projections, 147
  quantification, 87–8
  simulation, 91–2
  studies, 18–19, 68, 118–19
Land Use Science, 101
Landsat, 74, 84–6, 98–100, 107
landscape, as flexible unit, 118
landscape dynamics, 119
landscape ecology, 68–9, 75, 87, 151
landscape ethnography, 77
landscape fragmentation metrics, 87–8
landscape history, 36
landscape/regional level, 101, 106–8
laser systems, 84
legal remedies, access to, 141
Leibenstein, H., 41–2
life cycles, 81
lifestyle, changes in, 155
lineages, segmentary, 4
Linnaeus, Carl, 50
local level analysis, 103–6
“local trap,” 95
logging, 80, 141
London, cholera outbreak, 72, 73, 76
long-term ecology research sites (LTERs), 150, 152
LUCC see land-use and land-cover change

Madagascar, 100
maladaptive behaviors, 67
Mali, 74
Malthus, Revd Thomas Robert, 25
Malthusian theory, 26
management and decision theory, 41
Markov transition models, 91
MAS/LUCC models, 123
maximization of expected utility, 41–2
Maya, collapse, 11–13
mercantilism, 43
metapopulation models, 115–16
Mexico, deforestation, 78
Michigan, University of, 143
microeconomics, 37
migration, 32–4
as response to market failures, 33
mistrust, 129
modeling, and GIS, 88–92
MODIS, 99
molecular biology, 155
moral norms, 137
motor vehicles, increase, 9–11
multi-attribute trade-off analysis, 130
multidisciplinary research, approach to, 97–100
multi-scale analysis, 94–5
approach to, 97–100
future directions, 110–11
global level, 108–10
local level, 103–6
microscopic vs. macroscopic, 94
regional level, 101, 106–8
multi-temporal analysis, 107

Nang Rong District, 119
NASA, 18, 19, 98
National Academy of Science, 144
National Aeronautics and Space Administration (NASA), 18, 19, 98
National Center for Ecological Analysis and Synthesis, 112
National Institute for Child Health and Human Development (NICHD), 18, 19
National Oceanic and Atmospheric Administration (NOAA), 18, 19, 98–9
National Research Council (NRC), 17–19, 20, 144, 148
National Science Board, 20
National Science Foundation (NSF), 18, 97, 112, 144–5
coupled human–natural systems program, 118
human dimensions centers of excellence, 19–20
“natural carrying capacity,” 27
natural gas, 5
natural resources crisis state, 132
institutional shaping of use, 146
sustainable management, 139
natural selection, 49, 50, 115
nature, humans and, dichotomy between, 9
negatives feedback, 64, 67, 111
neofunctionalism, 67
neo-Malthusian theories, 26, 27
Nepal, 77
nested enterprises, 134
neutral theory, 52–3
New Economics of Labor
Migration, 33
NGOs, proliferation, 141
NICHD, 18, 19
niche theories, 52–3
Nigeria, agricultural intensification, 74
nitrogen cycle, alteration of, 11
nitrogen fixation, increase, 11–12
NOAA, 18, 19, 98–9
nonequilibrium theories, 61
nongovernmental organizations
(NGOs), proliferation, 141
nonlinear systems, 115
nonlinearities, 114, 118
norm activation, 40
North Atlantic Oscillation, 11
NRC, 17–19, 20, 144, 148
NSF, 18, 97, 112, 144–5
  coupled human–natural systems
  program, 118
  human dimensions centers of
  excellence, 19–20
nutrient cycling, 67
object view, 72
oceanic conveyor belt, 13
oil, 5
open-access resources, 38–9
open systems, 64
optimal foraging theory, 37
organic methods, 6
Ostrom, Elinor, 132, 133
Our Common Journey, 144
oxisols, 79
ozone depletion, 8
Pacific island countries, 156
palm-based agroforestry management, 100
panda habitat, 119–20
Papua New Guinea, warfare study, 65
parks, 152
pastoralists, 4, 6
  farmers and, 4
  patches, 59–60
  size reduction, 60
pathogens, geographic expansion, 13
Pearl River delta region, 152
perception, 90, 122
peripheral countries, 43
persistence, 50, 52, 61
Peru, 84
place, importance, 70
place-based research, 111
planned behavior, 40
plant associations, 51–2
plant communities
  non-analog, 52
  as organisms, 51
Pokot population distribution, 74
political ecology, 44–6
political economy, 42–6
pollution, levels in cities, 7
polycentric governance systems, 132
population
  analysis of, 72
  boundaries of, 103
  and consumption, 6
  and environment, theories, 31–4
  and technological innovation, 26
population dynamics, 20, 33, 115, 118, 124
  drivers, 52
  spatial multi-species, 124
population genetics, 49
population growth, 3, 4, 9–10
  and consumption habits, 8
  poverty and, 43
positive feedback, 64, 67, 118
poverty
  and population growth, 43
  reducing, 145
predators, 53, 54, 57, 60, 115
predictability, 39, 98, 109, 113
preferences
  clarifying, 130
preferences (Cont’d)
construction, 137
price-based recreated, 128
revealed price, 130
societal, 131
pre-processing, 106–07
price-based recreated preferences, 128
Prisoner’s Dilemma, 90, 122
probabilistic judgments, 131
progressive contextualization, 106
propagules, 56
property rights debates, 76
protected areas, status, 125
provision rules, 133
proximity analysis, 152
psychology see environmental psychology; human psychology
public health, 147
punctuated equilibrium, 50
qualitative comparative analysis (QCA), 95
Quickbird, 84, 85, 86, 99
radar systems, 84
rain forest pygmies, 47
rainfall, changing pattern, 154–6
Rappaport, Roy, 64–7
raster data, 75
rational action, 130
rational adaptation, limits, 130
rational behavior, 37, 38
rational choice, failure, 132
rational theory, 130
realized niche, 52
reasoned action, 40
reciprocal altruism, 67
reciprocity, 2, 132, 134, 152
recycling, 135, 136–7, 146
redundancy, 40
REED, 140
reforestation, 57–9
regional level analysis, 101, 106–8
regional modeling, 96
regulation, cost/benefit monetization, 128
reification, problems of, 67
relay floristics, 56
remittances, 33, 34
remote sensing, 74
and GIS, 74–7, 127
case studies, 77–83
in multidisciplinary research, 97–100, 101, 104, 106–7
in spatially explicit analyses, 117
in vegetation analysis, 104
reputation, 132
requests for proposals (RFPs), 145
resettlement schemes, 31
resilience, 113
resource utilization, 46
resources management, 125, 132
rice, 15, 80
Rio Declaration, 141
risk
adjustments to, 153
climate of, 41
management theories, 41
perception, 40
risk analysis techniques, 127
ritual, 65–6
Rondonia, 80
Roundtable on Science and Technology for Sustainability, 144
rules design, 132–3
rural landscapes, and urban areas, 151–2
sampling, 54
ground-truth, 108
local level, 103–6
satellites
earth-orbiting, 74, 98–9
see also remote sensing
“satisficing” approaches, 130
scale
absolute vs. relative, 75
importance, 93
issues, 93–4, 100, 111
terminology, 75
see also multi-scale analysis;
multi-temporal analysis
scale discordance, 96
Index 213

scaling ladder strategy, 124
scarcity, and technology changes, 27
scenario-building, 131
schooling, access to, for girls, 29
Science Plan, 19
sea level rise, 156
seasonal biological phenomena, 13
seawater desalination, 147
sedentarization, 2
segregation model, 90, 122
Sekher, M., 133
selective rationality, 42
self-interest, 37, 132
self-organization, 40, 134, 144, 149
to protect resources, 39
self-organizing systems, 115
semi-peripheral countries, 43
semivariogram, 88
sensitivity analysis, 121–2
shanty towns, 87
Shorea robusta, 77
Shoshoni, 46–7
Sierra Leone, 77
site-specific studies, 32
slash-and-burn methods, 6, 79, 90
slavery, 44
“smart heuristics,” 42
Snow, John, 75
Snow map, 72, 75
Social and Behavioral Sciences
Directorate, 112
social context, and environmental
decisions, 136–40
social control, 152
social ecological systems, evolution,
2–6
social networks, 38
social rule systems theory, 137
Social Science Research Council
(SSRC), 17, 18–19
social stratification, 6
socioecological system, 149
socioeconomic change, and climate
change, 146–77
socioeconomic systems, as ecological
systems, 144
soil analysis, 105–6
soil level, 101
soil quality, and crop choice, 82–3
soil types, 104, 105
spatial analysis, 72, 76–7
see also urban–rural spatial
dynamics
 spatial cognition research, 90, 122
spatial dimension, temporal dimension
vs., 23
spatial economics, 27
spatial interaction models, 88, 121
spatial sampling procedures, 87
spatial structure, 84, 88, 101
spatially explicit approaches, 70–3
see also GIS; remote sensing;
urban–rural spatial dynamics
spatially explicit heterogeneity,
113, 115
spatially explicit processes, 115–20
species
extinctions, 114, 116
increase, 11–12
individualistic response, 51–2
interactions, 52–3
species dispersal, 117
spectral analysis, 107
spectral mixture analysis, 86
multiple end-member, 86
sports utility vehicles (SUVs), 135
SPOT satellites, 74, 98–9, 107
SSRC, 17, 18–19
Stata, 72
STELLA, 64
Steward, Julian, 46–8
stochastic approaches, 64
stress, response to, 63, 68
subsidies, 44
subsistence, 46–8
subsistence economy, 103
succession, 54–9, 80, 85
causes, 57
theories, 54
SUGARSCAPE, 64
surface temperature, northern
hemisphere, increase, 11–12
survey research, 130
sustainability, 7, 113, 120, 125
agricultural, 155
climate change and, 153–6
defining pressing problems, 145
definition, 145
scales of, 149
sustainability committees, 146
sustainability science, 143–57
cities and, 149–52
education in, 148
journals, 148
research priorities, 144, 145–8
SWARM, 64
Sweden, eco-labeling, 135
systems analysis, 62, 113
systems theory, 64
taxonomy, 44
technology
changes in
population pressures and, 26
projecting, 147
scarcity and, 27
technology adoption theory, 138
telecommuting, 151
temperature, changes in, 154, 155
temporal dimension, spatial dimension vs., 21
TERRA, 99
terrestrial environmental model, 109
texture, 84, 88, 101
Thailand, 119
thresholds, 113, 114, 116, 118
tolerance, 56
traffic jams, 150
“tragedy of the commons,” 38, 62, 127
Transamazon Highway, 78
transformation, 114
transportation
costs, 28
emissions reduction, 148
public, 155
travel behaviors, 136
trust, 2, 38, 132, 134, 152
Tsembaga Maring, 65
Ultimatum Game, 90, 122
ultisols, 79
uncertainty, 41, 128–31
United Nations, 44
Universal Transverse Mercator (UTM), 71
urban areas, and rural landscapes, 151–2
urban centers
rise, 5
see also cities
urban ecology, 5, 150–2
urban-industrial populations, 42
urban materials, classes, 86
urban planning, 150
urban–rural gradient, 87, 89
urban–rural spatial dynamics, 83–8
urbanization, 29, 85, 147
elements characterizing, 85
hydrological changes associated, 152
regions experiencing, 30–1
US Climate Change Program, 129
USA
and greenhouse gas emissions, 8
southwestern, water resources management, 138
valuation, 148
value conflicts, 8, 128, 128–30
value-focused thinking, 130
Vayda, Andrew, 64–5
vector data, 75
vegetation
mapping, 104
structure, 104
vegetation class, 101, 105, 106, 112
Vegetation-Impervious Surface-Soil (VIS) fractions, 86
Venezuela, 90
Vietnam, 156
villages, nucleated, 119
visualization, technologies, 75
von Thünen, Johann, 27, 34
Vostock Ice Core, 14
warfare, 4, 65–6
water availability, 155
water control, complex, 5
water pollution, 150
water resources management, 138–9
water rights, 125
wetlands, disappearance, 7
world food markets, 43
world system theory, 42–3
Wu, J., 124