

# Index

---

- Aaheim, H.A. 87, 101, 103, 107, 110, 111, 112  
Abramowitz, M. 147  
acidification 223  
'Action for global sustainability' 249  
Adriaanse, A. 329, 334, 379, 386, 388, 433  
Africa, Sahel region, vegetation  
    productivity as a sustainability indicator 238–9  
Ahmad, Y.J. 56  
air pollution 278–9  
Alcamo, J. 230  
Alfsen, K.H. 334, 335  
Allen, S.A. 292  
alternative development prescriptions 179  
alternative welfare index 160–61  
Amann, C. 386, 388  
Amir, S. 327  
Andreasen, J.K. 276, 278, 329, 333, 334  
Anielski, M. 423, 440  
aquatic systems 272, 295  
    sustainability indicators and thresholds 229–32  
Argyle, M. 84  
Arrow, K.J. 126  
Arthur, W. 15  
Ashby's Law of Requisite Variety 405  
Asheim, G.B. 36, 98, 118, 122, 125, 126, 162  
Asian financial crisis 174  
Askildsen, T.C. 104  
Atkinson, A. 155, 200–201  
Atkinson, G.K. 35, 118, 129, 131, 140, 179, 187, 197, 430  
Atkinson index of distributional inequality 155, 200–201  
AtKisson, A. 418  
Australia  
    ecological economic efficiency (EEE) ratio 356, 357–8  
    exploitative efficiency ratio 362–4, 370  
    GPI 441  
    growth efficiency ratio 360–62, 369  
    Index of Sustainable Economic Welfare (ISEW) 193  
    maintenance efficiency ratio 358–60, 361, 362, 369  
    natural capital exploitative efficiency ratio 367, 368  
    natural capital growth efficiency ratio 363  
    policy relevance of eco-efficiency indicators 355–75  
    psychic income 357  
    renewable natural capital growth efficiency ratio 365, 366  
    service efficiency ratio 356–8, 359  
    sustainable net benefit index (SNBI) 40, 143–5  
Auty, R.M. 128  
Ayres, L. 350  
Ayres, R.U. 44, 79, 209, 323, 350, 379, 389  
Baltic 21 Secretariat 292  
Barkley, P. 167  
Barkman, A. 231, 232  
Barnett, H. 250  
Barnhart, R.K. 320, 321, 322  
Bartelmus, P. 80, 86, 98  
Bauer, R. 90  
behaviour, human 16  
Behrens, A. 377  
Bennett, J. 329  
Bergen Fylkeskommune 107  
Berkes, F. 210  
Beyeler, S.C. 277, 333, 336  
Binswanger, M. 389  
bio-growth curve 110–11  
biocapacity 44  
biocentric view 30–31

- biodiversity 23, 209, 225
  - and forests 240
- biological capacity, comparison with Ecological Footprint 255, 257
- biomass 110
  - extraction data 384
- biophysical view of the economy 432
- bioproductive areas 252, 254
- biosphere 432
- Bird, P.M. 282
- Birks, J.B. 405
- Bishop, R. 43, 159, 326
- Blamey, E. 440
- Blaug, M. 431, 441
- Blum, H. 21
- Bonriot, O. 434
- Bossel, H. 410, 413
- Bothnian Sea 232
- Boulding, K.E. 18, 29, 213, 354
- bounded carrying capacity 305, 310
- Braat, L. 435
- Bradbury, R. 336, 337
- Brekke, K.A. 98, 176
- Bringezu, S. 384, 386
- Brouwer, R. 123
- Brown, L.R. 248
- Brundtland Report 3, 252
- Brunner, P. 390
- Bruun, H. 309
- Bulte, E.H. 44, 258
- Burritt, R. 318, 320
- Burton, I. 427
  
- Cairns, J. 433
- calcium, and forest health 278
- 'Cambridge controversy' 44, 365–6, 441
- Canada 271, 433–4, 440
- Canada Forest Service, Criteria and Indicators program 276
- Canadian Council of Ministers of the Environment 433
- capital 17, 37, 38, 209
  - concept of 441–2
  - in forest context 274–5
  - human-made 17
  - and income 37, 38, 150, 151
- capital maintenance 20, 21
- capital theory 429–31
- capitalism 29
  
- Capra, F. 15, 16, 168, 353, 409
- carbon dioxide 260, 261, 439
- carbon sequestration 240
- cardinal utility 59, 60
- Caring for the Earth* 249
- Carley, M. 89
- carrying capacity, bounded 305, 310
- carrying capacity accounts 258, 259, 260
- Cartwright, T. 338
- Castañeda, B. 167, 175, 190
- Catton, W. 44
- Catton, W.R. Jr. 270
- causal networks 243
- Centre for Sustainability Studies 256
- Chaffee, S. 29
- change 15
- Chatterjee, P. 318
- Chen, X. 386
- Chew, A.E. 327
- Chew, R.M. 327
- Chile 167
- Chittenden, D. 415
- Christensen, P. 326
- Chu, E.W. 272
- Clark, R.N. 282
- Clarke, D. 330, 331
- Clarke, M. 167, 168, 169, 180
- Clayton, A. 168
- Clemens, M. 118
- Clements, F. 426
- Cleveland, C.J. 209, 210
- Clevering, O.A. 235
- climate, and choice of transport 106–9
- climate change 223
  - cost of 196–9
  - economic impacts 105–13
  - and green accounting 96–116
  - impact on forestry 109–12
  - and input–output schemes 104–5
  - macroeconomic impacts 112–13
  - physical estimates of change 102
- Cobb, C.W. 80, 142, 187, 188, 190, 191, 192, 196, 197, 200, 202
- Cobb, J.B. 28, 30, 80, 82, 139, 142, 154, 166, 178, 180, 186, 187, 188, 190, 191, 192, 196, 197, 200, 202
- coevolution 14–15
  - and path dependency 15
  - positive 15

- coevolutionary depiction of  
   sociosphere, economy and  
   ecosphere 16  
 coevolutionary worldview 4, 14–16  
   socio-economic process as 14–16  
 cognition, and human values 269–70  
 Colwell, R.R. 273  
 Commission of the European  
   Communities 56, 70, 202  
 Common, M. 440  
 competitiveness 261–3  
 complex systems 309–10  
   generic needs 410–16  
 complexity 353, 399, 405, 423  
 composite environmental performance  
   index 443, 444  
 composite indicators 433  
 composite sustainable development  
   index 443  
 conservation targets 252  
 consumer durables, cost 148  
 consumer price index (CPI) 154  
 consumerism 27, 85  
 consumers, and resources 310  
 consumption 223  
   and welfare 79, 80, 84–6, 152–3  
 consumption pressure index 443  
 control of systems 405–10  
 Corden, M. 69  
 CORINE 223, 227  
 Costanza, R. 3, 21, 35, 216, 218, 227,  
   273, 348, 350, 418, 432, 439  
 cost–benefit analysis 59, 60, 67  
   and damage costs 129  
 Cramer, W. 239, 240  
 Crampton, P. 425  
 Crawford, T. 433  
 critical natural capital  
   defining 234–5  
   indicators and measures 221–45  
   in wetlands 232–6  
 Cronin, K. 426  
 Cross, G. 85  
  
 Dahl, A. 317, 337  
 Daily, G. 23  
 Dale, V.H. 277, 333, 336  
 Daly, H. 18, 21, 28, 29, 30, 33, 42, 43,  
   80, 82, 83, 139, 153, 159, 166, 167,  
   178, 180, 186, 190, 191, 196, 209,  
   210, 348, 360, 366, 418, 431, 432,  
   433  
 damage assessments, and green  
   accounting 101–3  
 damage costs 102–3, 129  
   environmental degradation 97  
 Daniels, P.L. 378  
 Dasgupta, P. 61, 119, 125, 126, 281  
 Dasmann, R. 426  
 David, P. 15  
 Davis, P. 425  
 De Angelis, D. 428  
 De Bruin, R. 233  
 de Groot, R.S. 221  
 De Haan, M. 79  
 de Haes, U. 390  
 de-linking, relative and absolute 383  
 debt 28  
 defensive expenditures 87, 149–50,  
   156–7, 201–2  
   definition of 201  
 dematerialisation 388  
   policy 377  
 Deolalikar, A. 178  
 DeSimone, L.D. 318, 319  
 DeSouza-Huletey, J.A. 333  
 devaluation 70  
 developing countries 167–8, 182  
 Diefenbacher, H. 142, 166, 180, 190  
 Diesendorf, M. 418  
 Dietz, T. 292  
 discount rates, and uncertainty 217  
 disequilibria 15  
 ‘disinvestment’ 55, 59, 67  
 disservices generated by economic  
   activity 149  
 ‘distress syndrome’ 272, 273  
 division of labour 387  
 Dixon, C. 177  
 Dixon, J. 216  
 Dodds, S.H. 399  
 Doelman, J.A. 339  
 Dopfer, K. 168  
 Dovers, S.R. 292  
 driving forces–pressures–state–impact–  
   response (DPSIR) 382  
 drylands  
   natural capital index 238  
   Sahel, case study 238–9  
   soil erosion 237

- soil organic matter 237
- sustainability indicators and thresholds for ecosystems 236–9
- threats and indicators 237–8
- vegetation productivity 237
- Dryzek, J.S. 292
- Dutch Disease 66, 68–71, 72
- Dye, T.R. 337
- Dyke, C. 353
- Earth
  - as a dissipative structure 15
  - subsystems 15
  - uniqueness for life 21
- Easterlin, R. 85, 147
- Easton, B. 425
- eco domestic product (EDP) 88, 96
- eco-efficiency 42–3
  - disciplinary perspectives of 322–9
  - eco-system ecology approaches 324–5, 327–8
  - etymological origins of term 320–22
  - and humankind's dependence on the ecosphere 349–50
  - meaning of 318–22
  - and natural and human-made capital 349
  - neoclassical economic approaches 324, 326–7
  - solutions and the coevolutionary paradigm 351
  - thermodynamic approaches to 323–5
  - WBCSD definition 319
- eco-efficiency indicators 383–4
  - analytical validity 333
  - applied to Australia 355–75
  - appropriate data transformations 333
  - appropriate scale 333–4
  - clarity of message 335
  - criteria for ideal 332–5
  - data availability and cost effectiveness 334–5
  - definitions of 317–18, 319, 329
  - efficient representation of a concept 334
  - limitations of 335–7
  - literature 317–18
  - philosophical bias 333
  - for policy 317–43
  - policy relevance 334
  - semiotic view 329–32
  - strengths of 337–8
  - theoretical support for 332, 349–55
- eco-efficiency ratios, and the coevolutionary worldview 354–5
- eco-intelligent products 388
- ecological deficit 256
- ecological economic efficiency (EEE) 42–3
  - ratio, Australia 356, 357–8
- ecological economics, and thermodynamics 432–3
- Ecological Footprint 43–5, 162, 251–7, 270, 284
  - comparison with biological capacity 255, 257
  - and ecosystem health 270–73
  - limitations of analysis 258–60
  - measurement 271–2
  - methodology 251
  - New Zealand 438–9, 443
- Ecological Footprint accounts 246–63
  - interpretation of results 260–63
- ecological imbalance, and pathogens 273
- ecological integrity 272
- ecological overshoot 247–8, 253, 259, 263
  - measuring 251–61
- Ecological Principles of Resource Management* 426
- ecological resilience 273, 310, 429
- ecological succession 426–8
- ecological wealth 62
- ecology, origin of word 322
- economic activity, sustainability 158
- economic growth
  - costs 166
  - and policy 177
  - and public policy 175
- economic policy
  - misled by faulty accounting 67–8
  - uses of national and environmental accounts 81–2
- economic welfare measure 80
- economy
  - biophysical view of 432
  - sociosphere and ecosphere

- atomistic–mechanistic depiction
  - 14
  - coevolutionary depiction 16
- and sustainability 249
- economy-wide material flow
  - accounting (MFA) 379–81
  - categories of material flows 380–81
  - general scheme for 381
  - indicators 382
  - methodological foundations 379–80
- ecosphere 15, 22
- sociosphere and economy
  - atomistic–mechanistic depiction
    - 14
    - coevolutionary depiction 16
- ecosystem approach to sustainable
  - development 433–4
- ecosystem change 268–9
- ecosystem ecology approaches, to eco-
  - efficiency 324–5, 327–8
- ecosystem health 272
  - assessments 44–5
  - definition of 272–3, 273
  - and Ecological Footprints 270–73
- ecosystem quality 223, 225, 229
- ecosystem services 216, 218, 226–7
- ecosystems
  - definition 268
  - goods and services provided by
    - 227–9
  - monitoring technology 283–4
  - preservation 24
  - resilience 273
- education 202
- Edwards-Jones, G. 418
- EEA (European Environment Agency)
  - 376
- EEAC (European Environmental
  - Advisory Councils) 376
- efficiency, derivation of word 320–21
- Egypt 260, 261
- Ehrlich, A. 248
- Ehrlich, P.R. 23, 210, 248, 309, 426
- Eickhout, B. 241
- Eisenmenger, N. 386, 387
- Ekins, P. 221, 234, 236, 282, 378, 390
- Eklundh, L. 238
- El Sarafy method *see* user cost method
- El Sarafy, S. 33, 61, 64, 65, 67, 127,
  - 128, 158, 193, 400
- El Serafy Rule 36
- employment
  - link with gross domestic product
    - (GDP) 28
    - unpaid 28, 368
- Energy Efficiency and Conservation
  - Authority 317
- England, R.W. 201, 217
- English Nature 221
- entropy law 432
- environment, information on 270
- Environment Agency, Japan 379
- environmental accounting
  - approaches to 79–80
  - monetary approach 83–4
  - monetary environmental accounts
    - 86–9
    - and policy making 78–95
    - policy uses 81–2
    - problems of monetary valuation
      - 86–7
      - purpose 81, 90
- environmental costs, in money terms
  - 80
- environmental degradation 98
  - damage costs 97
- environmental governance, new
  - approaches 377
- environmental indicators 89–90, 422
- environmental input–output tables 88
- environmental Kuznets curve (EKC)
  - 383
- environmental policy 377
- environmental sustainability index
  - (ESI) 278, 439–40
- environmentally sustainable growth
  - 383
- equilibrium ecology 426–8
- equilibrium-based approach 323
- Erkkilä, J. 294, 295, 296
- An Essay on the Principle of Population*
  - 270
- Etzioni, A. 337
- EU Natura 2000 nature protection
  - area 293
- Europe
  - monetary value of natural capital
    - 226, 227
    - NCI 223
- European Commission 376, 378

- EUROSTAT 379, 380, 381, 382, 386  
 eutrophication 223, 229, 273  
 exchange 29  
 existence 27  
 existential balance 26  
 exploitative efficiency, of natural  
   capital 347  
 exploitative efficiency ratio, Australia  
   362–4  
 extractive activities 67–8
- Faber, M. 16, 212, 213, 351, 352, 353  
 families 413–14  
   indicators of viability 414  
 Fankhauser, S. 197  
 FAO (Food and Agriculture  
   Organization) 239, 241, 384  
   State of the World's Forests 276  
 Farley, J. 418  
 Faucheux, S. 430, 441  
 Femia, A. 385  
 Ferreira, S. 130  
 Fields, G. 177  
 Finger, M. 318  
 Finland  
   forestry and reindeer management  
     311  
   indicators of bounded carrying  
     capacity 305  
   Ministry of Agriculture and  
     Forestry 297  
   pasture degradation 302  
   quality of sustainability indicators  
     308  
   Reindeer Husbandry Research  
     programme 308  
   RENMAN project 302–8  
   sustainable reindeer management  
     296–308  
     carrying capacity 301  
     comparison and MoAf and  
     RENMAN indicators 304  
     deficiencies of indicators 302, 304  
     free range reindeer 305  
     indicators 300–301  
     legislation 301  
     path dependent history 306  
     policy measures 306  
     policy-guiding value of scenario-  
     framed indicators 308–11  
     pressure of numbers 298  
     PSR indicator framework 297  
     reindeer herding co-operatives 299  
     revised indicators 307–8  
     slaughter of reindeer 306  
   Finland, Vuossari harbour project  
     293–6, 310–11  
   tri-butyl tin (TBT) 294–6  
   Finnish Game and Fisheries Research  
     Institute 297  
   fiscal policy 70–71  
 Fischer, H. 387  
 Fischer-Kowalski, M. 39, 388  
 Fisher, H. 6, 17, 18, 36  
 Fisher, I. 146, 188, 201  
 fisheries 233  
 Flavin, C. 192  
 Flyvbjerg, B. 292, 308  
 Folke, C. 21, 210, 348  
 Foran, B. 386  
 Forbes, B.C. 297, 302, 306, 309  
 Forest Capital Index (FCI) 270,  
   274–80, 284  
   aggregation of indicators 277–9  
   audiences and users 280–81  
   benchmarks 279–80  
   changes over time 279–80  
   collection and upkeep of data 279  
   construction 276  
   linking to economic and social  
     indices 282–3  
   selection of indicators 277  
   spatial scales for 282  
 Forest Stewardship Council 276  
 forests  
   and biodiversity 240  
   carbon sequestration 240  
   cultural values 241  
   degradation and deforestation 241–2  
   forest health and calcium 278  
   forestry and reindeer management  
     311  
   fuel wood 240  
   impact of climate change 109–12  
   importance 240  
   indicators of condition 276  
   lost old-growth forests 159, 160  
   monitoring 275  
   sentinel species in 278  
   as a sink 110

- slope stabilisation 241
- sustainability indicators and thresholds for forest systems 239–42
- threats to 241–2
- water supply 240
- Førland, E.J 106
- fossil fuels 260
- extraction data 284
- Fox, K. 421
- France, national income 81
- Frank, R. 85
- Frankhauser, S. 119
- Frederick, S. 218
- free-market 29
- French Natural Patrimony Accounts 79
- Friend, G. 317
- Fundamentals of Ecology* 327
- Funtowicz, S. 416
- Gallopin, G.C. 330, 332, 333, 334, 434
- Geist, H.J. 241
- genuine progress indicator (GPI) 31, 36–42, 139, 140–42, 431, 440–41, 444
  - compared to ISEW 142
  - improved valuation methods 160–61
  - items used to construct 147–52
  - theoretical foundation 142–7
  - USA, 1950 to 1995, items used to calculate 141
  - valuation methods used to calculate 152–60
- genuine savings (GS) 34–5, 36, 117–35, 431, 441–2
  - accounting for environmental pollution 129–30
  - assumption of constant population 125–6
  - based on inter-temporally efficient economy model 123, 131
  - basic meaning of 117–18
  - criticisms of 122–30
  - empirical estimates 118–21
    - and exogenous shocks 123–4
  - exogenous technical progress 124
  - natural capital depreciation 126–8
  - non-constant discount rate 125
  - as a percentage of GNP 120
  - policy usefulness 130–32
  - positive contribution of 121–2
    - and resource abundance 121
    - terms-of-trade effects 124
- George, S. 28, 151
- Georgescu-Roegen, N. 18, 213, 348, 432
  - on production theory 210–12
- Germany, national income 81
- Gilbert 321
- Giljum, S. 377, 386, 388, 390, 391
- Gini Coefficient 154, 155, 200, 201, 203
- Glauser, M. 317, 319
- Global Footprint Network 254
- global system 15, 212–15
  - fund elements 212–13
  - logos of 15
- global warming 22
- globalisation 387–8
- Goedkoop, M. 390
- Goldberg, E. 425
- Goldemberg, J. 359
- Golley, F.B. 322, 327, 328
- Goodland, R. 433
- Gordon, P.L. 129
- Gorz, A. 85
- The Government's Approach to Sustainable Development*, New Zealand 444
- green accounting 55–77
  - aims 97–9
  - change in prices 96–7, 113
  - and climate change 96–116
  - cost estimate 102
  - and damage assessments 101–3
  - greening methods 71
  - measurement 97–9
  - and welfare 58–61
- green gross domestic product (GDP) 422, 440–41
- green national accounts 97
- green national income 79–80, 83, 88, 90, 91
- green net national product (gNNP) 117
- Green, P.A. 230
- greenhouse gases 269
  - social cost 196–7
- Grice, H. 331
- Groombridge, B. 292

- gross domestic product (GDP) 33, 55, 98, 140, 431  
 data sets 384  
 inadequacies 146  
 link with employment 28  
 Thailand 175
- gross national product (GNP) 78, 82, 140, 193
- Grove 329
- growth addiction 27
- growth efficiency, of natural capital 346
- growth efficiency ratio, Australia 360–62
- Guenzo, G. 142, 190
- Gustavson, K. 334
- Guyer, M. 85
- Hagen, J.B. 328
- Hagerty 176
- Hajer, M.A. 292
- Ham, C. 337
- Hämäläinen, R. 390
- Hamilton, C. 142, 166, 180, 190, 197, 202, 418, 441, 444
- Hamilton, K. 35, 117, 118, 124, 125, 126, 127, 129, 152, 156, 216, 442
- Hamiltonian 60–61
- Hammer, M. 386
- Hammond, A.A. 329
- Hans-Böckler-Stiftung 387
- Hardi, P. 333
- Hardin, G. 270
- Harris, R. 89
- Hartwick, J.M. 68, 97, 117, 127, 430
- Hartwick Rule 68, 118, 122
- Hauge, K. 107
- Hawley, A.H. 270
- Hayward, B. 416
- headline indicators for sustainability, definition 423–4
- Headline Indicators for Tracking Progress to Sustainability in New Zealand* 421, 443
- health 273
- Heikkinen, H. 303, 305, 307, 309, 312
- Hein, L.G. 233, 234, 235, 236
- Helm, D. 326
- Helsinki processes 275, 283
- Heywood, V.H. 240
- Hicks, J. 20, 32, 59, 60, 97, 98, 167, 326, 430
- Hicksian income 193
- Hill, M. 337
- Hinterberger, F. 317, 318, 319, 377, 380, 385, 387, 388, 389, 409
- Hirsch, F. 29, 85
- Hodgson, G. 16, 29
- Holling, C.S. 292, 429
- holons, economy, ecosystem and society as 16
- Hooker 321
- Hope, C. 443
- Hotelling, H. 127
- Howarth, R. 159
- Hubacek, K. 386, 391
- Huetting, R. 82, 98, 123
- Hughes, T.P. 309
- Hukkinen, J. 292, 298, 299, 303, 304, 305, 306, 309, 335, 351
- human capital, investment in 119
- human demand, on nature 246–8
- human development 27
- human development index 179, 421
- human futures, sustaining 274
- human values, and cognition 269–70
- human–environment interaction 291–316
- human-made capital 17, 19, 27, 37, 146  
 labour as 18  
 maintenance efficiency of 346  
 and psychic income 18  
 service efficiency of 345–6  
 and technology 20
- human-made capital account 372–3
- Huq, A. 273
- hybrid measurement technique, sustainable development 123, 131
- hydrologic cycle 210
- ignorance 351  
 closed and open 353–4  
 reducible and irreducible 353  
 taxonomy of 352
- income  
 and capital 37, 38, 150, 151  
 definition of 20  
 Hicksian definition 32  
 relative to others 85



- and subjective well-being (SWB)
  - 84–5
  - versus wealth 61–3
- income distribution 155
- income inequality 200–201
- income redistribution 177–8
- index of distributional inequality 148, 154–6
- Index of Sustainable Economic Welfare (ISEW) 31, 36–42, 45, 80, 139, 140–42, 218, 431, 440–41
- adjusting private consumer expenditure for income inequality 200–201
- alternative development
  - prescriptions 179
- alternative names for 139, 186
- application of 168–72
- Australia 193
- capture of sustainability paths 179
- changes in methodology 186
- compared to GPI 142
- construction and uncertainty 180–82
- core components 188
- cost of consumer durables 148
- cost of sacrificed natural capital services 151–2, 157–60
- criticisms of 186–206
- cumulative cost of long-term environmental damage 196–200
- deduction of defensive expenditures 201–2
- defensive and rehabilitative expenditure 149–50, 156–7
- and derivative studies 187
- disservices generated by economic activity 149
- improved valuation methods 160–61
- index of distributional inequality 148, 154–6
- lack of theoretical foundation 187
- net capital investment 150
- net foreign lending/borrowing 150–51
- Netherlands 198
- policy implications 166–85
- private consumption expenditure 147–8, 152–4, 188, 200–201
- resource production or resource consumption 190–91
- resource rents or replacement costs 191–3
- services provided by volunteer and non-paid household work 149
- services yielded by existing consumer durables 148
- services yielded by publicly provided human-made capital 148–9
- standardisation 161
- Sweden 198
- systems analysis 178–9
- Thailand, case study 166–85
  - policy implications 175–8
  - results 172–5
- theoretical foundation 142–7
- theoretical superiority 147–52
- total resource rents or user cost method 193–6
- UK 199
- US 199
- for USA and Europe 41
- weighting of private consumption expenditure 148
- indicators 404–5, 421–3
  - definitions of 329
  - for tracking sustainability in a nation state 421–48
- Indonesia 128
- Industrial Commodity Statistics, UN 384
- inflation 70
- information on environment 270
- Inglehart, R. 85
- input productivity 67
- input–output (IO) analysis 385
- input–output schemes 103–4
- ‘institutional sclerosis’ 29
- institutions 16
  - defined 29
- integrated analysis 102–3
- integrated sustainability modelling 386–7
- intergenerational equity 429–31
- Intergovernmental Forum on Forests (IFF) 275
- internalising externalities 431–2
- International Energy Agency (IEA) 384
- International Monetary Fund (IMF) 28, 66, 69

- international trade data sources 384  
 Islam, S.M.N. 167, 168, 169, 180  
 ITTO (International Tropical Timber Organisation) 275
- Jackson, T. 142, 166, 180, 188, 190, 196, 197, 200, 201  
 Jansson, A. 209–10  
 Jansson, B. 209–10  
 Jansson, A. 43  
 Japan, Economic Council 80  
 Johnson, L. 30  
 Jollands, N. 320  
 Jordan, A. 378  
 Jorgensen, E. 336
- Kaikkonen, R. 294  
 Kaosa-ard, M. 175  
 Karr, J.R. 272  
 Kates, R. 427  
 Kay, J. 327, 428  
 Kemppainen, J. 308  
 Kenny, C. 27  
 Keuning, S. 79  
 Keynesians 81  
 Khalil, E.L. 323  
 Killock, T. 178  
 King, D. 81  
 Kleijn, R. 386  
 Klein, E. 320  
 Klinge, M. 233  
 Klingemann, H.-D. 85  
 Kneese, A.V. 79  
 Knight, F. 351  
 Koestler, A. 328  
 Kokkelenberg, E. 61  
 Kondepudi, D. 323  
 Koskinen, H. 308  
 Krautkramer, J. 246, 250  
 Kreuter, M. 31  
 Kunte, A. 122  
 Kurtz, J. 329, 332, 334, 335  
 Kuznets, S. 81  
 Kyoto Accord 269, 281
- labour, as human-made capital 18  
 Laitinen, J. 294, 295  
 Lambin, E.F. 241  
 land, developed and undeveloped 213  
 Lapland 306, 307
- Laszlo, E. 15, 354  
 Lawn, P.A. 19, 20, 21, 28, 30, 40, 43, 139, 153, 158, 159, 166, 180, 187, 190, 193, 201, 317, 348, 350, 355, 356, 360, 369, 371  
 Lazarsfeld, P. 81  
 Lebergott, S. 180  
 Lee, K.N. 292  
 Lee, V. 273  
 Leemans, R. 239, 241  
 Leibenstein, H. 326  
 Leipert, C. 157, 201  
 leisure time 160  
 Lenssen, N. 192  
 Lenzen, M. 44  
 Leontief, W. 103  
 Lerner, J. 308  
 Lessing, H. 308  
 Levett, R. 190  
 Liebowitz, S.J. 309  
 life cycle assessment (LCA) 390  
*Limits to Growth* 438  
 Lindblom, C.E. 337  
 Lindeman, R.L. 327  
 Lindsey, G. 335, 336  
 linear throughput representation of the socio-economic process 16–19  
 Lintott, J. 81  
 living planet index 443  
 Lochner, K. 31  
 logos, of the global system 15  
 Lone, O. 79  
 long-term environmental damage 159, 160, 196–200  
 lost natural capital services account 372  
 lost natural capital services (uncancelled cost) 19, 38, 42, 143–5, 344  
 Lotka, A.J. 321, 327  
 Lovelock, J. 22–3  
 low entropy resources 20  
 Lüdeke, M.K.B. 238
- McCarthy, J.J. 241  
 McDonald, G. 425  
 machines of work 323  
 McKay, A. 178  
 McLeod, J. 29  
 McMichael, A.J. 273

- macroeconomy 15, 16  
 maximum sustainable scale 43–4  
 as a subsystem 16
- Maffi, L. 273
- Mager 283
- maintenance cost approach 87
- maintenance efficiency, of human-made capital 346
- maintenance efficiency ratio, Australia 358–60
- Maler, K. 152, 156
- Mäler, K.-G. 97, 98
- Malthus, T. 270
- Manning, I. 175
- Manoliadis, O. 336
- Mant, A. 408
- marginal abatement cost 129
- marginal social cost 197, 200
- Margolis, S.E. 309
- market economy 29
- Marks, N. 166, 180, 190
- Marshall, A. 67, 71
- Martinez-Alier, J. 327, 388
- Maslow, A. 24
- Maslow's hierarchy of human needs 24–6, 27
- Massa, I. 305
- material flow accounting (MFA) 378  
 aggregation and valuation of  
 material flows 389–91  
 economy-wide 379–81, 391  
 physical input–output tables (PIOTs) 391  
 shortcomings 389–91
- material flow-based indicators 376–96, 443  
 availability 385–6  
 calculation procedures 384–5  
 direct material input (DMI) 382  
 domestic material consumption (DMC) 382–3, 383  
 domestic processed output (DPO) 382  
 eco-efficiency indicators 383–4  
 integrated sustainability modelling 386–7  
 on the macro level 382–6  
 main input indicators 382  
 micro–macro links and analyses of rebound effects 388–9  
 physical trade balance (PTB) 383  
 policy-oriented application 386–9  
 total material consumption (TMC) 383  
 total material requirement (TMR) 382
- materials balance approach 79
- matter-energy, throughput of 17, 146, 433
- Matthews, E. 276, 280, 379, 386
- Max-Neef, M. 6, 37, 40, 139, 189, 401, 411
- Maxwell, S. 178
- May, R. 428
- Mayor, F. 399
- Mazzucato, V. 238
- Meadows, D.H. 21, 247, 248, 438
- measure of domestic progress (MDP) 186
- Mendelsohn, R. 110
- metal ores and minerals, extraction data 284
- Meybeck, M. 230
- Meyer, B. 387
- Mikesell, R.F. 128
- Millennium Ecosystem Assessment 225–6, 236, 246
- Miller, T. 426
- Mills, T.J. 282
- Ministry for the Environment 333
- MIPS (material input per service unit) indicator 317, 389
- Mishan, E. 431
- Mitchell, B. 433
- Mitchell, W. 28, 369
- Moffatt, I. 44, 142, 190
- Moll, S. 385, 386
- monetary environmental accounts 86–9  
 to monitor progress 87–8
- Montreal processes 275, 283
- Montreal protocol 269
- Moore, S. 378
- moral capital 29–30  
 measurement 31
- Morris, M. 320
- Morris, W. 320
- Morse, C. 250
- Mortensen, L.F. 334, 335

- MOSUS (modelling opportunities and limits for restructuring Europe towards sustainability) 385, 386
- Mulder, P. 14
- Muller, P. 317, 319
- Mündl, A. 386
- Muradian, R. 388
- Murray, S. 44
- Nair, I. 323
- NAMEA system 66, 79
- national accounts 70
  - accuracy 66
  - as a database for economic analysis 102
  - demand-side valuation 100
  - input–output schemes 103–4
  - for macroeconomic analysis 103
  - policy uses 81–2
  - role of prices 99–101
  - shadow prices 100
  - supply-side valuation 100
  - valuation by analogy 100
- national impacts assessment, sector studies applied to 105–13
- national income 36, 37, 79, 97
  - accounting, choice of framework 81
- National Research Council, US 292
- natural asset deterioration/losses 55, 59
- natural capital 17, 19, 20, 31
  - assessment of importance 225–7
  - components of 210, 215
  - critical survey 209–10
  - definitions of 210, 215–16
  - depreciation 126–8, 131
  - determining criticality 242
  - and ecological sustainability 21
  - exploitative efficiency of 347
  - framework to determine criticality 222–7
  - growth efficiency of 346
  - indicators and measures of critical natural capital 221–45
  - information gaps concerning 281–2
  - life-support function 21–2, 44
  - meanings of 217–18
  - measurement of 36, 216–17
  - monetary value in Europe 226, 227
  - net depreciation 119
  - revision of concept 212–16
  - threat assessment 223–5
  - transformation into human-made capital 20
- natural capital accounting 43–4, 373
- natural capital exploitative efficiency ratio, Australia 367, 368
- natural capital growth efficiency ratio, Australia 363, 364
- natural capital index (NCI) 223, 225, 228–9
- drylands 238
- natural capital stock 431
  - measurement of 209–20
- natural resources
  - erosion 63
  - scarcity 326
  - value of depletion 87
- Natural Step 249
- natural wealth 400
- nature
  - human demand on 246–8
  - parasitism of society 271
- Nature's Numbers* 61
- Nectoux, F.J. 90
- needs 248–9
  - being fully human 417
  - bicycle example 408, 413
  - classification of 401
  - in a complex system 408–10
  - ethical basis of an approach 403–4
  - frog example 408–9, 413
  - generic needs of complex systems 410–16
  - issue of need 400–404
  - Maslow's hierarchy 24–6, 27
  - satisfaction of 402, 415
  - satisfying as a social control system process 407
  - stakeholder involvement 415–16
    - and sustainable development indicators 399–420
    - and system orientors 415
- neoclassical economic approaches, eco-efficiency 324–5, 326–7
- net adjusted savings 118–19
- net capital investment 150
- net foreign lending/borrowing 150–51
- net psychic income 18, 38, 42, 149, 344, 348
  - account 371–2

- Netherlands
- De Widen case study, critical natural capital in wetlands 232–6
  - defining critical natural capital 234–5, 236
  - fisheries 233, 235
  - habitat service 234, 235
  - linking services to water quality 234
  - recreation 234, 235
  - reed cutting 233, 235
  - Index of Sustainable Economic Welfare (ISEW) 198
- Neumayer, E. 40, 65, 120, 122, 123, 124, 127, 128, 131, 140, 152, 155, 156, 157, 158, 159, 162, 180, 187, 189, 190, 192, 193, 197, 202
- New Zealand 421
- criteria for sustainability indicators 436
  - Ecological Footprint 438–9, 443
  - environmental accounts 425
  - environmental performance indicators (EPI) 424
  - evaluation of headline sustainability indicators 436–44
  - The Government's Approach to Sustainable Development* 444
  - initiatives in sustainability indicators 424–5
  - measurement of social progress 425
  - Ministry for the Environment and the Department of Statistics 424, 436
  - Programme of Action for Sustainable Development* 444
  - Resource Management Act 1991 433
- Ng, S. 167
- Ng, Y. 167
- Nicholson, S.E. 238
- Nielsen, N.O. 273
- Niemeijer, D. 238
- nitrogen 229
- critical loads 230–32
  - dissolved inorganic nitrogen (DIN) 229–30, 231
  - in rivers, as a sustainability indicator 229–30
- non-declining capital 35
- non-declining natural capital 36
- non-equilibrium ecology 428–9
- non-renewable resources 24, 33, 159, 189
- depletion 190–202, 203
- Nordhaus, W.D. 61, 80, 175, 178, 180, 186
- Noredeng, T.E. 106
- Norgaard, R.B. 15, 43, 159, 192, 327, 409, 410
- North, D.C. 309
- Norway 103–4
- bio-growth curve for forests 110–11
  - impact of climate change on forestry 109–12, 114
  - macroeconomic model of travelling patterns and forestry 112–13
  - RegClim project 106
  - transport choice and climate 107–9, 114
- Norwegian Natural Resource Accounting System 79
- Notarnicola, B. 390
- novelty 353–4
- Nyborg, K. 87, 101
- O'Connor, J. 323
- O'Connor, M. 29, 123, 131
- Odum, E.P. 327, 328, 427
- Odum, H.T. 328, 426
- OECD 263, 292, 317, 376, 377, 378, 382, 422
- Oegema, T. 142, 166, 180
- Olson, M. 29
- Olsson, L. 238
- O'Neill, R.V. 328
- Opschoor, H. 44, 434
- optimal macroeconomic scale 39
- ordinal utility 59
- organisational reliability 309
- Ott, W.R. 278, 335, 337
- output, estimating 58
- overgrazing 274
- ozone concentration 223
- ozone depletion 159, 160, 196
- ozone layer 269
- Page, S.E. 242
- Pan European Forest Certification 276
- Pandey, K.D. 122
- Pareto, V. 321

- Parker, J. 443  
*pars pro toto* trap 328, 336, 337  
 path dependency indicators 310  
 pathogens, and ecological imbalance 273  
 Patterson, M.G. 421, 425, 439, 440, 441, 442, 444  
 Patz, J.A. 273  
 Peacock, K. 271  
 Pearce, D. 21, 30, 31, 35, 83, 84, 118, 123, 155, 258, 259, 260, 348, 430, 431  
 Pearce, D.W. 201  
 Pearse, P. 281  
 Peet, J. 403, 410, 413, 418  
 Peet, K. 403, 418  
 Peng, C. 329, 334  
 Perrings, C. 19, 212, 348  
 Perrow, C. 309, 310  
 Peskin, H. 98  
 Petty, W. 81  
 Pezzey, J. 36, 118, 162  
 Pezzoli, K. 426  
 physical input–output tables (PIOTs) 391  
 Pigou, A.C. 37, 59, 60, 167, 178  
 Pinkerton, R.C. 328  
 Pitt, D. 28  
 planning theory, and public policy 433–4  
 Poldy, F. 386  
 policy  
   eco-efficiency indicators for 317–43  
   and economic growth 177  
   emphasis on non-economic subsystems 178  
   pro-poor policies 177–8  
 policy making, and environmental accounting 78–95  
 ‘political will’ 269  
 polluter pays principle 130  
 pollution 62–3, 70, 71, 83, 91  
   air 278–9  
   and forests 242  
   and genuine savings (GS) 129–30  
   particulate emissions 122, 129  
   transboundary and global 129–30  
 population 125–6  
   density 223  
 Portney, P.R. 217  
 Posch, M. 230  
 positive coevolution 15  
 poverty 27, 177–8, 182, 401–2  
 pressure–state–response (PSR) indicator system 291–2, 295, 382, 405  
 prices, role in national accounts 99–101  
 Prigogine, I. 323  
 Prince, R. 129  
 Prince, S.D. 238  
*Principles* 67  
 private consumption expenditure 147–8, 152–6  
   adjusting for income inequality 200–201  
   measurement 153  
 pro-poor policies 177–8  
 production activities, and psychic income 18  
 production theory 326  
   dimensionality of funds and flows 210–11  
   Georgescu-Roegen on 210–12  
 production waste 21  
 Proops, J. 130, 351  
 property rights 123  
 psychic income 18, 150  
   Australia 357  
   and human made capital 18  
   measurement 153, 201–2  
   and the natural environment 18  
   and non-economic pursuits 18  
   and production activities 18  
 public policy, and planning theory 433–4  
 pulsing paradigm 429  
 Pykh, Y. 329  
 Pykkönen 294  
 Qiao, L. 386  
 quality of life 32, 262, 401, 403  
 quasi-immortality 22  
 Radcliffe, N. 168  
 RAINS model 230  
 Rametsteiner 283  
 Ramsar Convention 269  
 Randall, A. 326  
 Randla, T. 317

- Rapport, D.J. 44, 270, 272, 273, 274, 275, 277, 282
- Ravetz, J. 416
- rebound effects 388
- recycling 21, 210
- Redclift, M. 292
- Reddy, A. 359
- Redefining Progress 139, 141, 160, 190, 191, 256
- Rees, W. 44, 250–51, 438
- Rees, W.E. 271, 378
- regrettables 180–81
- regulation policies 377
- rehabilitative expenditure 149–50, 156–7
- Reijnders, L. 390, 434
- reindeer, sustainable management 296–308
- renewable natural capital growth efficiency ratio, Australia 365, 366
- renewable resources 246, 251
- rent, and royalty 71
- Repetto, R. 87
- replacement cost approach 157, 158, 159, 191–3, 203
- resilience 273, 310, 429
- resource extraction 24, 33–4, 119, 120, 122, 131
- resource prices 250
- resource production or resource consumption 190–91
- ‘resource rents’ 68, 126–7, 157, 158, 190, 191–3, 203
- total resource rent method 193–6
- resources, and consumers 310
- Rietkerk, M. 310
- rights and privileges 30
- Rio Earth Summit 3
- risk, and uncertainty 351–2
- Ritthof, M. 389
- Rive, N. 112
- Robè, K.-H. 249
- Robertson, J. 418
- Robinson, J. 147, 345
- Roche eco-efficiency rate (EER) 317
- Rochlin, G.I. 309
- Roe, E. 309
- Romero, J.A. 235
- Rosenberg, D. 190
- Rosenberg, K. 142, 166, 180
- Rosser, J.B. Jr. 209
- Ruth, M. 323
- Ryan, G. 123, 131
- Saddler, H. 441, 444
- Saebo, H.V. 334, 335
- Sahel syndrome 238
- Salim, E. 270, 274, 275, 281
- Sametz, A. 178
- Samuelson, P.A. 61, 175
- Sanders, R. 19, 40, 139, 146, 159, 160, 166, 180
- Sanders, R.D. 190, 193
- Sanderson, S. 292
- satellite accounts 56, 57, 62, 63, 66, 79, 162
- purpose 80
- Satellite System for Integrated Environmental and Economic Accounting (SEEA) 80, 88
- Saudi Arabia 120–21, 127, 132
- scarcity 123, 326
- Scasny, M. 386
- scenario-framed indicators, policy-guiding value 308–12
- Schaltegger, S. 318, 320
- Schandl, H. 386
- Scheffer, M. 235, 292, 310
- Schjolden, A. 103, 110
- Schmidheiny, S. 317, 318, 319, 349
- Schmidt-Bleek, F. 383, 388
- Schnaiberg, A. 27
- Schneider, E. 428
- Schneider, E.D. 327
- Schröder, T. 213
- Schumacher, E. 84
- Schumpeter, J. 81
- Schütz, H. 384, 386, 388
- Scitovsky, T. 85
- Seckler, D. 167
- Seers, D. 81
- self-organisation 15, 21
- semiotics
- definition of 330
- and signs 330–31
- Sen, A. 181
- sentient non-human beings 30, 31, 32
- Seppälä, T. 383, 390
- service efficiency, of human-made capital 345–6

- service efficiency ratio, Australia 356–8  
 services 211, 251, 350  
 shadow prices 67, 100, 117, 131  
 Shipley, J.T. 320  
 Simon, J. 250  
 Simon, S. 282, 390  
 Simpson, J. 320, 321, 329, 330  
 sink functions 432  
 Skeat, W. 320, 322  
 Slobodkin, L.B. 327  
 Smeets, E. 44  
 Smil, V. 213  
 Smith, Adam 61  
 Smith, G.A. 85  
 social accounting matrices (SAMs) 70  
 social capital 16  
   measurement 31  
 social and environmental indicators  
   89–90  
 social indicators movement 421  
 social processes 407  
 social product 60  
 social security 178  
 ‘social trap’ 3  
 social values 407  
 society, subsystems 168, 178  
 socio-economic process  
   coevolutionary worldview 14–16  
   linear throughput representation  
   16–19  
 sociosphere 15  
   economy and ecosphere  
   atomistic–mechanistic depiction  
   14  
   coevolutionary depiction 16  
 Sohngen, B.L. 110  
 solar energy 192, 213  
 Söllner, F. 326  
 Solow, R.M. 61, 117, 430  
 Spangenberg, J. 377, 383, 384, 387, 434  
 speciation 23  
 species extinction 23  
 Spellerberg, A. 31  
 Speth, J.G. 248  
 Stahmer, C. 381, 391  
 standardisation 161  
 State of the World’s Forests, FAO 276  
 statistics 82  
   data sources 384  
 Stephens, R. 425  
 Stiller, H. 317, 318, 319  
 Stockhammer, E. 142, 156, 157, 190,  
   196  
 Stockhammer, L. 166, 180  
 Stockholm Environment Institute 246  
 Stone, W. 31  
 Strand, G.-H. 110  
 strong sustainability 36, 61, 63–5, 72,  
   83–4, 89, 186  
   and green accounting 64–5  
 structural inertia 15  
 Sturm, A. 261, 318  
 Stymne, S. 142  
 Sub-Saharan Africa 66, 132, 177  
   genuine savings (GS) 120  
 subjective well-being (SWB) 84–5  
 substitution 20, 21, 64, 80, 246  
 surprise  
   concept of 351, 354  
   sources of 352  
 sustainability 20, 246, 248–9, 262, 263  
   definition of headline indicators  
   423–4  
   definitions of 426  
   ecological interpretations 426  
   of economic activity 158  
   and economy 249  
   headline indicators 421–48  
   measuring 251–61  
   and path dependence 309  
   social construction 292  
   *see also* strong sustainability; weak  
   sustainability  
   ‘sustainability gap’ 390–91  
 sustainability indicators  
   general selection criteria 434–5  
   history and rationale 421–3  
   initiatives in New Zealand 424–5  
   theoretical bases 425–34  
 sustainability paths 179  
 sustainability scenarios 291–316  
 sustainable development 83, 275  
   broad definition 31–2  
   definitions of 13–19  
   dimensions of 433  
   ecological and biophysical factors  
   20–24  
   economic factors 27–8  
   ecosystem approach to 433–4  
   hybrid measurement technique 123



- as increasing eco-efficiency 42–3
- as increasing economic welfare 36–42
- as increasing Hicksian income 32–4
- indicators 275
- as non-declining capital 34–5
- as non-declining natural capital 35–6
- as overshoot avoided 43–5
- psychological factors 24–7
- social/cultural factors 29–31
- sustainable development indicators 3, 317
  - and human needs 399–420
  - policy-guiding value 11, 45
- sustainable economic welfare (SEW) 38, 39
  - alternative measures 139–65
  - measurement 161–2
- sustainable living, as a goal 416
- sustainable net benefit index (SNBI) 40, 139, 142, 146
  - Australia 40, 356
- sustainable net domestic product (SNDP) 32–4, 38, 142, 146–7, 148, 149
- sustainable resource management, obstacles to 250–51
- Svedang, H. 235
- Sverdrup, H. 231
- Sweden 260–61, 262
  - Index of Sustainable Economic Welfare (ISEW) 198
- Sykkö, S. 295
- System for Integrated Environmental Economic Accounting (SEEA) 56, 378, 379, 422
- system of national accounts (SNA) 56, 160, 378, 379
- systems
  - Bossel's orientors and fundamental properties of environment 411–12
  - control of 405–10
  - generalised 411
- systems analysis 178–9
- taxation 177–8
- Tcherneva, P. 369
- technological progress 248
- technological systems 309
- technology 20, 103, 104
- Ten Brink, B.J.E. 223, 225
- Thailand
  - comparison of ISEW per capita and GDP per capita 176
  - corruption 180
  - GDP 175
  - ISEW, case study 166–85
    - policy implications 175–8
    - results 172–5
- thermodynamic approaches to eco-efficiency 323–5
- thermodynamics
  - and ecological economics
    - interpretations 432–3
  - first law of 21
  - second law 21, 181, 432
- Theys, J. 79
- threshold hypothesis 139, 140, 161–2, 167, 189
  - and replacement costs 192
- throughput of matter-energy 17, 146, 433
- Tietenberg, T. 281
- Tiezzi, S. 142, 190
- Tobin, J. 80, 175, 178, 180, 186
- Tol, R.S.J. 110
- Tomasello, M. 291
- Total Wealth Indicator, World Bank 423
- trade 387–8
- transport, choice and climate 106–9
- tri-butyl tin (TBT) 294–6
- Turner, K. 431
- Turner, R. 348
- Turner, R.K. 123, 221, 232
- UK
  - England, national income 81
  - Index of Sustainable Economic Welfare (ISEW) 199
- Ulanowicz, R.E. 327
- Ullsten, O. 270, 274, 275, 281, 284
- Ulph, A. 201
- UN (United Nations) 62, 63, 80, 89, 99, 379, 421
  - Agenda 21 3
  - Industrial Commodity Statistics 384
- UN (United Nations) Forest Forum (UNFF) 275

- uncancelled benefit 38, 39, 40, 42, 142, 368
- uncancelled benefit (net psychic income) account 371–2
- uncancelled cost 38, 39, 40, 42, 142, 143–5, 345
- uncancelled cost (lost natural capital services) account 372
- UNCED (United Nations Conference on Environment and Development) 275, 317
- uncertainty 180–82
  - and discount rates 217
  - and risk 351–2
- UNDP (United Nations Development Programme) 179, 246, 272
- unemployment 27–8
- UNEP (United Nations Environmental Programme) 58, 246, 249, 272
  - Global Environment Outlook program 275
  - World Conservation Monitoring Centre 254, 256
- Union of Concerned Scientists 249
- United States Geological Survey (UNGS) 384
- universal well-being 247
- UNSD (United Nations Statistical Division) 56, 57, 65, 156
- unused domestic extraction (UDE) 384
- US
  - Ecological Footprint 271
  - GPI, 1950 to 1995 141
  - Index of Sustainable Economic Welfare (ISEW) 41, 199
  - Office of Management and Budget 217
- user cost method 59, 64, 65, 67, 71, 72, 158, 159, 193–6, 203, 369
- utility satisfaction 18
  
- valuation techniques 161, 162
- value judgements 180, 181
- value-added, estimation 98
- Van Berkum, J.A. 234
- van den Bergh, J. 14, 44, 258, 260
- Van der Veeren, R.J.H.M. 235
- van der Voet, E. 390
- van Eeten, M.J.G. 309
- van Kooten, G.C. 44, 258
- van Tongeren, J. 98
- van Vuuren, D. 44
- variable, use of term 332
- Vaze, P. 79
- Verbruggen, H. 44, 258, 260
- Verheyen, R. 377
- Vibrio cholerae* 273
- Vincent, J.R. 130
- Vitousek, P.M. 44, 268, 309, 432
- Volterra equation 110
- voluntary sector 401
- volunteer and non-paid household work 149
- von Weizsäcker, E.U. 376
- Vos, J. 435
- VROM council 258
  
- Wachtel, P. 85
- Wackernagel, M. 44, 162, 250–51, 258, 261, 271, 378, 438
- Walz, R. 334
- Warr, P. 166, 177
- waste generation 24, 258
- water 240, 258
- Waterboard Groot Salland 234
- Waterhouse, J. 428
- Watkins, K. 166, 177
- Watson, R.T. 240
- Watt, K. 426
- Watts, M. 369
- Waugh, A. 336
- WBCSD (World Business Council for Sustainable Development) 319, 349
- WCED (World Commission on Environment and Development) 3, 252, 275, 349
- WCN (World Conservation Union) 249
- weak sustainability 64, 72, 83–4, 87, 117, 122, 131, 132, 259, 430
- wealth
  - measurement 62
  - versus income 61–3
- Wealth of Nations* 61
- Weiner, E. 320, 321, 329, 330
- Weisskopf, W. 26
- Weiszacker, E. 359
- Weitzman, M.L. 61, 98, 217, 218

- welfare 72, 78, 81, 82  
 alternative welfare index 160–61  
 and consumption 79, 80, 84–6  
 definitions of 176, 186  
 economic welfare measure 80  
 and green accounting 58–61  
 income-adjusted measures 178  
 welfare comparisons 60  
 welfare economics 59, 326  
 welfare monitoring 89  
 welfare theory 431–2  
 Welford, R. 318, 320  
 well-being, universal 247  
 wetlands  
 critical natural capital in 232–6  
 studies of services and values 232  
 Weyant, J.P. 217  
 White, H. 178  
 Whitehead, A. 336  
 Whitford, W. 273, 274, 277  
 Wiegert, R.G. 328  
 Wiens, J. 428  
 Williams, J.M. 319  
 ‘willingness to pay’ 86–7, 90, 100, 122,  
 131, 216  
 Wilson, E.O. 252  
 Wilson, M. 142  
 Wilson, M.C. 190  
 Wiltage, C. 162  
*Winners and Losers in Global  
 Competition* 261  
 Withagen, C. 36, 118  
 Wolf, S.A. 292  
 Woodward, R.T. 232, 326  
 Woodwell, G.M. 279  
*Work and Ecology* 387  
 World Bank 31, 56, 65, 66, 69, 118,  
 119, 121, 126, 129, 131, 178, 246,  
 272  
 Total Wealth Indicator 423  
 World Commission on Forests and  
 Sustainable Development 270,  
 274  
*World Conservation* 269, 272  
 World Conservation Union (IUCN)  
 249  
 World Economic Forum 261, 278, 439  
 World Resource Institute (WRI) 272,  
 386  
 Pilot analysis of Global Ecosystems  
 276  
 World Wide Fund for Nature (WWF)  
 249, 256  
 Wray, R. 369  
 Wright, J. 333, 425, 435  
 Wui, Y. 232  
 Wulff, F. 327  
 Wuppertal Institute 317, 384, 434  
 Yount, D. 258  
 Ziman, J. 434  
 Zolatas, X. 167  
 Zorraquin, F. 349