

Index

- acclimation, 267, 272, 273, 291, 358
- acetylene, 208, 213
- acid rain, 181
- acidification, 15, 179, 180, 192, 202, 205, 212, 216, 219, 446, 452, 457, 466
- acidity, 173, 178, 181, 191, 192, 478
- actinobacteria, 209
- actual yield, 11, 41, 491
- adaptation, 45, 70, 77, 84, 86, 99, 100, 103, 118, 121, 122, 245, 246, 248, 251, 264, 275, 340, 431, 437, 455, 484, 507
- adiabatic, 141, 142, 151
- advection, 147, 148, 150, 157
- aerated soil, 160, 201, 400, 475
- aerenchymatous tissues, 186, 359, 383
- agricultural chemicals, 21
- agroforestry, 288, 455, 457
- AGW, 150, 154, 494, 507, 510
- air temperature, 125, 137, 138, 139, 142, 144, 146
- albedo, 136, 156, 157
- alfalfa, 26, 29, 34, 35, 77, 82, 88, 212, 213, 220, 232, 273, 278, 300, 311, 401, 421, 453, 457, 461, 488
- Alfisol, 192
- alkaline soil, 178, 328, 386, 445
- allelopathy, 54, 70
- aluminum toxicity, 192
- amaranth, 73
- amino acids, 24, 25, 26, 38, 166, 196, 207, 212, 294, 305, 334
- ammonia, 198, 203, 206, 221, 223, 225, 226, 337
- ammoniacal fertilizer, 206, 207
- ammonification, 180, 202, 203, 228
- Anabaena azollae*, 210
- Andisol, 173, 192
- animal feed, 3, 24, 25, 37, 71, 356, 426
- animal manures, 175, 180, 195, 214, 222, 226, 504
- animal nutrition, 25, 64, 217, 226
- animal power, 497, 501
- anion exchange, 177
- anoxia, 359, 383
- antagonism, 61
- anthesis, 26, 27, 97, 105, 109, 119, 246, 310, 327, 362, 363, 364, 439, 460, 471
- anthropogenic global warming, 494, 510
- apical dominance, 304, 309, 319
- arable area, 409, 492
- arable land, 28, 32, 71, 215, 217, 218, 223, 224, 424, 458, 473, 481, 492, 505
- ash alkalinity, 179, 192, 221
- asparagus, 74, 91, 92, 351
- assimilate supply, 96, 99, 249, 286
- associative N fixation, 209, 210
- atmospheric transport, 144
- attainable yield, 11, 19, 41, 69, 82, 85, 87, 89, 92, 95, 354, 361, 364, 369, 393, 400, 421, 441, 443, 457, 473, 482
- attenuation coefficient, 48, 70, 236, 279, 283
- autonomy, 7, 22, 500
- available water, 191, 232, 241, 242, 243, 261, 377, 380, 385
- AW, 185, 192, 241, 242, 380
- Azolla, 209, 210, 511
- azonal, 171, 192
- Azospirillum*, 209
- Azotobacter*, 209
- Bacillus*, 86, 204
- banana, 6, 270, 290
- barley, 6, 33, 72, 73, 74, 81, 94, 104, 107, 198, 202, 300, 301, 340, 352, 368, 380, 389, 391, 426, 447, 461
- basal metabolism, 34, 39
- basin irrigation, 394, 395
- bean, 63, 67, 68, 72, 75, 99, 107, 114, 211, 212, 246, 259, 279, 309, 310, 311, 312, 447
- beef cattle, 180, 223
- beer, 48
- best management practice, 226, 228, 510
- biochar, 508
- biocide, 16, 482, 505, 506, 507
- biodiesel, 28, 426, 427, 428, 430, 431, 435, 495
- bioethanol, 425, 426, 427, 428, 429, 435
- biofuel, 12, 23, 425, 427, 428, 429, 430, 431, 432, 433, 434, 435, 495, 496, 502, 508, 509, 510
- biological control, 79

biological nitrogen (N) fixation, 180, 208, 214, 228, 478	cattle, 28, 29, 30, 32, 34, 37, 215, 219, 221, 222, 224, 416, 429, 497
biomass production, 89, 168, 211, 260, 267, 302, 361, 368	cecum, 31, 32, 43
biotechnology, 81, 85, 86, 87, 92, 269, 431, 433, 482, 494, 505, 507	cellulase, 31
black body, 125, 126, 157	center pivot, 394, 396, 409, 410
Blackman, 67, 70	cereal cyst nematode, 367
bluegrass, 26, 327	CF, 26
blue-green algae, 199, 209	CGR, 13, 46, 47, 48, 49, 50, 51, 53, 55, 69, 70, 362
border check, 394, 409, 410	chard, 314
border effects, 148	chemical activity, 97
Bouguer-Lambert, 48	chemical composition, 15, 42, 257, 292, 318, 386, 387, 405
Bowen ratio, 147, 157	Chernozem, 171, 192
break of season, 105, 243, 448	chickpea, 72, 101, 447
Bt resistance, 466	chilling injury, 270, 291
bulk density, 34, 159, 170, 182, 192	clay mineral, 165, 175, 176, 179, 181, 199
buoyancy, 139, 140, 143, 144, 146, 150, 152, 157	climate change, 19, 20, 22, 118, 119, 150, 153, 302, 425, 439, 452, 455, 494, 495, 501, 502, 504, 507, 509, 510
burning, 21, 202, 339, 426, 428	climax, 45, 70, 461
C/N ratio, 167, 169, 191, 199, 201, 205, 206, 223, 227, 342, 468	clonal line, 82
C3, 53, 87, 255, 259, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 274, 275, 276, 278, 279, 284, 285, 289, 290, 291, 299, 366, 427, 463, 467	<i>Clostridium</i> , 209
C4, 53, 87, 210, 255, 259, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 274, 275, 276, 278, 284, 285, 289, 290, 291, 299, 366, 427, 463, 467	cloudiness, 133, 151, 154
cabbage, 107	clover, 48, 49, 77, 82, 102, 107, 115, 116, 117, 181, 220, 284, 288, 445, 452
calcium, 159, 175, 177, 179, 181, 188, 199, 337	CNCp, 333, 334, 357
CAM, 255, 263, 264, 265, 289, 290, 291	CNCs, 357
canary grass, 107, 430, 512	coefficient of economic yield, 24
canola, 18, 73, 198, 318, 359, 426, 446, 447, 448, 450	coefficient of variation, 119
canopy architecture, 49, 262, 276, 284, 285, 291, 505	coffee, 6, 72, 107, 288
canopy photosynthesis, 277, 279, 280, 282, 283, 285, 288, 464	companion crop, 65
canopy structure, 278, 281, 287, 290	compensation point, 265, 266, 268, 275, 291, 294
capillary rise, 391, 394, 410	competition, 9, 11, 44, 51, 54, 55, 56, 58, 59, 60, 61, 64, 65, 70, 84, 87, 117, 148, 249, 287, 288, 305, 306, 307, 314, 316, 364, 367, 370, 384, 400, 411, 422, 432, 434, 488, 496, 498, 501, 502, 506
carbohydrate, 23, 38, 52, 57, 73, 207, 262, 263, 265, 292, 295, 301, 305, 308, 309, 463, 464	complementation, 61, 62
carbon isotope discrimination, 291	Conservation Law, 128, 137, 304, 314
carbon sequestration, 192	conservation reserve, 491
carbonic anhydrase, 263	conservation tillage, 15, 18, 341, 344, 345, 353, 355, 357, 420, 461, 462, 466, 470, 500, 502, 506, 508, 509, 510
carbon-to-nitrogen ratio, 201, 228	constructional respiration, 301
carboxylase enzyme, 25	consumer, 29
cardinal temperature, 67, 68, 70, 122	continuous cropping, 4, 344, 475
carrot, 48, 107	contour banks, 371
carrying capacity, 22, 23, 39, 40, 41, 43, 217, 219, 488, 489, 490, 493	controlled release fertilizer, 206, 468
cassava, 6, 38, 249, 253, 254, 269, 271, 287, 290, 361, 426, 487	conventional tillage, 170, 342, 344, 373, 378, 420, 466
cation exchange capacity (CEC), 176, 191, 192, 199, 205, 478	coordination of growth, 302
	corn, 11, 64, 86, 170, 220, 311, 355, 459, 477, 480, 512
	Corn Belt, 6, 45, 63, 64, 170, 172, 188, 220, 323, 344, 431, 459, 460, 462, 464, 465, 466, 467, 471, 479, 480
	corn rootworm, 64

- Cosine Law, 127, 128, 152, 187
cotton, 6, 18, 28, 48, 74, 79, 83, 86, 99, 107, 224, 250, 270, 275, 279, 280, 285, 286, 325, 339, 340, 355, 358, 389, 402, 403, 423, 426, 448, 458, 461, 477, 480, 507
coupling, 138, 293
cover crops, 15, 16, 205, 225, 228, 279
critical concentration, 357
critical nutrient concentration, 357
crop area, 79, 93, 174, 237, 394, 432, 441, 459, 461, 462, 482, 492, 509
crop boundary layer, 143, 145, 157
crop coefficient, 234, 235
crop cover, 138, 188, 234, 241, 242, 250, 279, 379, 395
crop diversification, 447, 453, 457
crop diversity, 447
crop growth rate, 13, 45, 46, 50, 53, 55, 69, 70, 178
crop improvement, 75, 85, 118, 249
crop management, 14, 77, 85, 94, 96, 118, 157, 159, 323, 326, 332, 396, 445, 448
crop photosynthesis, 262, 277, 278, 280, 281, 283, 284, 285, 314, 506
crop residues, 11, 51, 166, 167, 175, 180, 186, 195, 199, 201, 202, 204, 205, 214, 223, 227, 339, 342, 432, 475, 476, 502, 504
crop rotation, 3, 4, 65, 78, 79, 169, 506
crop sequence, 356, 369, 382, 383, 441, 447, 458, 459
crop temperature, 392
cropland per inhabitant, 489, 510
crude fiber, 26
crude protein, 25, 26, 41, 43, 72
Cry toxins, 18
cultivation, 4, 6, 39, 41, 57, 78, 226, 316, 345, 349, 353, 354, 355, 358, 372, 380, 398, 414, 418, 420, 491, 492, 503, 506
CV, 119, 373
cyanobacteria, 199, 209
cycling, 4, 138, 154, 179, 191, 193, 195, 200, 217, 218, 342

dairy cattle, 40, 217
dark and light reactions, 263
dark respiration, 265, 266, 291, 294
daylength, 96, 100, 101, 102, 103, 104, 105, 107, 108, 111, 112, 120, 122, 129, 130, 246, 471
DE, 12, 33, 36, 39, 40, 43
decay series, 223, 228
decision support, 383, 450
decomposers, 42
deficit irrigation, 384, 404, 409, 410
deforestation, 481, 483
demographic shifts, 484, 485, 510
denitrification, 180, 196, 197, 199, 204, 205, 206, 207, 213, 216, 219, 227, 228, 338, 347, 468, 474
desalination, 384, 503, 510
determinate crop, 99, 246, 361, 363, 364, 382
developed countries, 7, 14, 18, 64, 88, 226, 412, 417, 419, 434, 456, 458, 485, 487, 491, 492, 496, 497, 498, 499, 501, 509
devernalization, 104, 122
dew formation, 139, 149, 150
dew point, 141, 151, 158
dicyandiamide, 206
dietary change, 497, 510
dietary energy, 39, 94, 321, 411, 413, 416, 418, 493
differentiation, 61, 64, 70, 97, 121, 304, 307, 308, 317, 471
diffuse radiation, 133, 134, 283
diffusion, 144, 150, 169, 186, 206, 253, 266, 269, 270, 272, 339, 359, 472, 474
digestible energy, 36, 38, 41
digestive system, 28, 29, 30, 43, 86, 154
domestic animals, 22, 28, 29, 31, 32, 33, 34, 41, 43
dominance, 14, 66, 83, 117, 304, 485, 499
dormancy, 45, 104, 114, 115, 116, 117, 118, 122
drip irrigation, 325, 339, 397, 398
drought avoidance, 251
drought resistance, 75, 77, 86, 87, 243, 255, 261, 374, 441, 454, 505
dry bulb, 142
duplex soil, 171

EC, 224, 386, 387, 388, 389, 390, 391, 406, 410
ecological intensification, 11, 22, 459, 482, 483, 503, 507, 508, 510
economic incentives, 439, 457
economic yield, 99, 243, 312, 403, 443, 459
ecosystem, 5, 195, 435, 451
ecotype, 78, 95
eddy diffusivity, 144, 277
eddy turbulence, 157
efficiency of resource use, 12, 13, 22, 59, 508
electrical conductivity, 325, 386, 387, 388, 410
electrochemical gradient, 294
elemental composition, 327
embodied energy, 415, 416, 417, 418, 424, 435, 501, 502
emissivity, 126, 127, 157
energy balance, 34, 117, 137, 138, 147, 148, 149, 151, 187, 188, 233, 236, 351, 423
energy budget, 148, 187, 415, 417, 424
energy content, 12, 40, 41, 140, 141, 417, 428
energy crops, 429, 430, 431, 432, 433, 434, 435
energy demand, 412, 435, 503
energy efficiency, 52, 175, 421, 422, 501, 503, 505
energy use, 12, 15, 18, 23, 345, 399, 411, 412, 413, 415, 416, 417, 419, 420, 421, 423, 424, 428, 433, 434, 480, 484, 491, 501, 502, 505
Enisfer, 210
enthalpy, 161, 192

- entropy, 161, 192
- environmental impact, 15, 66, 325, 334, 421, 433, 457, 458, 459, 482, 483, 484, 498, 508
- equilibrium constant, 160, 192
- equilibrium evaporation, 142, 157, 234
- equinox, 131, 134, 158
- equitability, 7, 22
- erosion, 3, 4, 7, 14, 15, 18, 20, 21, 65, 90, 185, 216, 225, 341, 342, 343, 344, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 369, 371, 372, 395, 403, 444, 445, 456, 461, 462, 470, 490, 498, 505
- E_s , 229, 230, 231, 234, 235, 236, 237, 241, 254, 257, 258, 360, 362, 364, 369, 370, 371, 379, 382, 395, 397, 398
- essential nutrients, 15, 70, 121, 324, 327, 330, 335, 476
- ET_0 , 167, 232, 234, 235, 366, 369, 373, 377, 397, 403, 439
- ethanol, 25, 426, 427, 429, 432, 433, 495, 496, 502
- eutrophication, 10, 195, 403
- evaporation, 15, 125, 136, 137, 138, 139, 140, 141, 142, 146, 168, 170, 187, 191, 229, 232, 234, 235, 236, 237, 241, 243, 260, 261, 371, 372, 377, 386, 392, 395, 397, 441, 466, 493
- evapotranspiration, 12, 139, 140, 145, 157, 179, 229, 232, 233, 235, 239, 240, 257, 258, 260, 261, 346, 365, 409, 410, 439
- exclusion hypothesis, 59
- exploitable yield gap, 11, 22
- exponential growth, 47, 56
- extinction coefficient, 282
- fallow management, 371, 379, 380
- fallow-crop, 216, 360, 373, 377, 378, 382, 453
- fallow-wheat, 15, 374, 375, 377, 443, 444, 445, 447, 457
- famine, 314, 491, 492
- farm management, 29, 321, 356
- farm size, 450, 462
- farming systems, 4, 5, 6, 7, 8, 10, 11, 13, 14, 16, 21, 22, 27, 28, 39, 148, 214, 215, 219, 321, 342, 437, 451, 455, 484, 490, 497, 500, 502, 504, 506, 510
- fat, 40
- FC, 184, 185, 186, 191, 192
- feedback, 47, 51, 69, 253, 267, 273, 317
- fermentation, 31, 32, 33, 224, 426, 427, 428
- fertility rate, 485
- fetch, 148, 157, 233, 351
- field capacity, 184, 185, 191, 192, 230, 231, 239, 360, 371
- field-specific N management, 483
- fitness, 77, 78, 269
- flooded soil, 169, 186, 210, 328, 472, 474, 475, 483
- flowering, 75, 78, 88, 98, 99, 101, 104, 105, 106, 107, 118, 119, 120, 121, 122, 243, 246, 252, 260, 276, 285, 286, 302, 304, 305, 315, 316, 327, 341, 348, 361, 363, 365, 382, 393, 427
- flux density, 52, 128, 157
- fodder beet, 314
- food demand, 9, 93, 174, 385, 424, 459, 484, 485, 491, 493
- food supply, 8, 17, 21, 32, 41, 71, 72, 73, 93, 174, 341, 385, 409, 484, 487, 489, 490, 492, 493, 496, 504
- forage crop, 15, 17, 38, 51, 65, 169, 179, 217, 361, 497
- forecasting, 457
- fossil fuel, 17, 18, 19, 23, 154, 155, 208, 272, 344, 411, 412, 413, 414, 416, 417, 423, 424, 433, 434, 435, 502, 507
- free energy, 161, 182, 183, 196, 297
- frost, 99, 149, 150, 152, 346, 365, 394, 460
- fuel requirement, 433
- fumigation-incubation, 199
- functional equilibrium, 212, 251, 261, 308, 319
- fungicide, 423, 466, 480
- furrow, 339, 345, 394, 395, 399, 400, 401, 410, 503
- fusion, 137, 149, 158, 411, 412, 434
- G, 24, 67, 137, 138, 142, 145, 147, 187, 188, 190, 234, 257
- GAP, 16, 498, 510
- Gas Law, 139, 140, 151, 183
- gasification, 204, 426
- GE, 33, 35, 39, 40, 43, 297, 298, 299, 319
- general resistance, 84
- genetic advance, 89, 90, 91, 95, 312, 463, 464, 465, 472, 483, 505, 509
- genetic diversity, 74, 84, 94, 112, 464, 507
- genetic engineering, 510
- genetic resource, 71, 92, 112, 501, 505
- genetic shift, 77, 78, 95
- genotype, 74, 77, 80, 84, 95, 120
- geographic information (GIS), 153, 157, 324, 326, 356, 358, 454, 510
- geographic position system (GPS), 326, 335, 357, 454
- germination, 87, 96, 97, 104, 112, 113, 114, 115, 116, 117, 118, 122, 293, 344, 472, 474
- germplasm, 21, 71, 73, 85, 91, 92, 94, 95, 113, 115, 118, 267, 464
- global carrying capacity, 493, 495, 510
- global food, 8, 9, 37, 432, 437, 473, 509
- global radiation, 133
- Gluconacetobacter*, 210
- glucose equivalent, 257, 297, 298, 306, 318
- glucose requirement, 296, 297, 299, 300, 319
- glucose value, 298
- good agricultural practices, 510
- government, 14, 17, 21, 92, 224, 354, 355, 426, 450, 451, 500, 508

GR, 296, 297, 299, 300, 319	ideotype, 314, 315, 316, 317, 319, 473
grain equivalent, 41, 487	imbibition, 113, 115, 122
grain legume, 87, 99, 212, 259, 300	immobilization, 197, 200, 201, 202, 204, 215, 217, 223, 228, 332, 339, 342, 356, 468
grain-fed livestock, 497, 510	in-breeding depression, 83
green manure, 175, 192, 220, 224, 415	Inceptisol, 192
green revolution, 93, 95, 314, 458, 472, 474, 483, 491, 505, 510	indeterminate, 99, 121, 122, 246, 247, 261, 309, 310, 312, 313, 316, 361, 460
greenhouse effect, 134, 135, 136, 154, 157	index tissue, 333, 357
greenhouse gas, 16, 17, 22, 135, 151, 156, 157, 170, 204, 459	indigenous supply, 357
gross energy, 36, 40, 41	indirect land use change, 429
gross heat content, 43	infiltration, 15, 171, 175, 185, 186, 351, 354, 360, 367, 371, 387, 394, 395, 396, 472, 478, 480
growth duration, 63, 65, 118, 251, 299, 362, 370, 371	integrated pest management, 18, 79, 467, 483, 507
growth respiration, 292, 302, 317, 463	intensity of farming, 4, 215, 416
growth substance, 304	intensive cropping systems, 481
growth yield, 296, 298, 306, 312	interference, 54, 55, 57, 59, 60, 61, 70
guano, 199	inversion, 152, 157, 342
GV, 297, 298, 299, 306, 319	ion activity, 192
gypsum, 176, 371, 407	ion exchange, 165, 181
	IPM, 79, 419, 423, 467, 475, 480, 481, 483, 501, 507
Haber–Bosch, 208, 227, 469	irradiance, 53, 70, 126, 127, 128, 132, 133, 157, 187, 264, 265, 266, 267, 268, 272, 273, 278, 279, 280, 281, 283, 284, 285, 286, 290
hard seed, 117, 118	irrigation scheduling, 234, 385, 402, 408, 410
harvest, 15, 19, 24, 28, 29, 40, 41, 43, 51, 73, 78, 89, 90, 91, 99, 118, 179, 199, 212, 215, 288, 302, 312, 315, 316, 318, 326, 329, 359, 364, 369, 379, 380, 414, 415, 418, 419, 420, 421, 427, 442, 461, 465, 471, 473, 474, 475, 476, 477, 478, 483, 510	irrigation water-use efficiency, 400, 410
harvest index, 15, 19, 24, 40, 43, 73, 78, 89, 90, 91, 215, 312, 315, 316, 318, 473, 483	isotope discrimination, 272
hay, 15, 27, 33, 34, 35, 36, 65, 179, 212, 215, 217, 218, 220, 352, 359, 421, 452	
H-bonding, 182, 183	jatropha, 502, 512
heat of combustion, 26, 27, 36, 263, 297	
hedgerow, 286, 287, 430	k, 88, 90, 138, 144, 147, 187, 200, 231, 259, 279, 281, 282, 283, 298, 362, 471
heliotropic, 251	Kentucky bluegrass, 512
herbicide, 18, 57, 65, 78, 79, 85, 86, 344, 359, 382, 420, 423, 431, 447, 448, 465, 466, 482, 498, 502, 506	Kira, 56
herbicide resistance, 18, 431, 482, 498, 506	kriging, 324, 357
heterosis, 83, 95	
HI, 12, 15, 24, 43, 90, 100, 330, 362, 363, 364	labor, 3, 4, 5, 7, 11, 14, 21, 22, 28, 36, 89, 206, 216, 220, 223, 226, 321, 341, 343, 345, 374, 395, 400, 411, 415, 416, 417, 419, 420, 422, 424, 432, 466, 474, 491, 497, 500, 501, 502, 505, 506
Histosol, 192	LAI, 48, 49, 50, 51, 69, 70, 234, 236, 241, 243, 250, 251, 253, 260, 262, 279, 281, 282, 283, 284, 285, 360, 361, 369
horizontal resistance, 84	land capability, 172, 355, 357, 494
horse, 32, 36, 414, 424	land equivalent ratio, 61, 70
horticultural crop, 14, 185, 286, 397, 398, 399, 403, 409	landrace, 74, 95, 359
HR, 84, 94, 95	lapse rate, 151, 152, 157
humus, 159, 162, 166, 167, 168, 169, 175, 176, 177, 181, 182, 191, 192, 197, 201, 202, 203, 227, 350	latent heat, 137, 139, 140, 149, 150, 151, 187, 188
hybrid maize, 82, 248, 462, 464	laterite, 173
hybrid rice, 310, 473	LDP, 101, 102, 103, 105, 107, 108
hybrid vigor, 82, 83, 95	leaching, 164, 176, 177, 179, 180, 185, 197, 199, 202, 203, 204, 205, 206, 213, 216, 217, 219, 222, 223, 225, 226, 227, 228, 330, 339, 348, 385, 386, 387, 390, 392, 396, 403, 405, 407, 408, 409, 410, 452, 453, 468, 480, 504
hydraulic conductivity, 236, 237, 238, 347	leaching requirement, 390, 396, 405, 409, 410
hypoxia, 468, 483	

- leaf area index, 70, 234, 281, 285
- legume rotation, 15, 17, 217, 220, 228, 422, 484, 494
- legume symbiosis, 211, 228
- legume-based pastures, 446
- lentil, 211, 447
- Lepidoptera, 18, 79, 86
- LER, 12, 61, 62, 63, 64, 65, 70, 288
- ley-farming, 181, 445, 447, 451
- Liebig, 67, 68, 69, 70, 307
- life cycle assessment, 413, 435
- lime, 15, 63, 169, 173, 181, 192, 211, 217, 224, 323, 324, 332, 343, 355, 452, 478
- lime requirement, 181
- limiting factor, 44, 68, 70, 203, 290, 306, 317, 382, 457
- limiting resource, 13, 62, 66, 70, 167, 308, 345, 376
- lipid, 25, 26, 27, 32, 43, 292, 293, 294, 297, 299, 300, 317, 432, 463
- Little Ice Age, 19, 153
- lodging, 57, 89, 91, 314, 330, 464, 465, 472, 473
- loess soil, 349
- logistic, 47
- long-term experiment, 213, 331
- long-wave radiation, 125, 135
- low-input agriculture, 331, 424
- lupin, 73, 368
- L_v*, 237, 238, 239, 248, 251
- lyotropic series, 176, 192
- lysimeter, 233, 261
- lysine, 38, 73
- machinery, 14, 18, 19, 20, 90, 286, 324, 359, 413, 414, 415, 416, 419, 420, 446, 478, 482, 501, 506
- maintenance breeding, 85, 89, 463, 475, 482
- maintenance respiration, 48, 57, 250, 295, 301, 317
- maize production, 332, 415, 417, 422, 428, 459, 461, 503
- Malthus, 490
- manure, 4, 12, 15, 16, 32, 35, 66, 90, 156, 168, 169, 180, 197, 202, 204, 205, 209, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 323, 336, 339, 342, 356, 414, 425, 458, 485, 500, 504, 506
- marker-assisted selection, 77, 464
- MAS, 77, 86, 95, 464
- mating, 74, 75, 81
- Mato Grosso, 323, 476, 477, 478, 480, 481
- ME, 33, 34, 36, 43, 184
- mechanization, 217, 286, 413, 419, 420, 431, 443, 457, 461, 474, 491, 509, 510
- medic, 368
- medieval farm, 215, 216, 328
- melon, 99, 316
- meristem, 97, 98, 99, 304
- Mesorhizobium*, 210
- methane, 33, 154, 156, 223
- methemoglobinemia, 206
- microclimate, 148, 151, 497
- micro-irrigation, 397, 399, 403, 409, 503
- m micronutrient, 86, 208, 328
- millet, 72, 114, 259, 331
- mineralization, 66, 167, 168, 178, 179, 189, 192, 195, 196, 197, 198, 201, 202, 203, 204, 205, 213, 217, 220, 223, 227, 228, 329, 332, 347, 371, 382, 445, 466, 474, 476, 504
- minimum tillage, 15, 371
- mixed cropping, 44, 61, 62, 288
- mixing height, 145, 146
- mobilization, 99, 113, 251, 283, 361, 367
- model, 16, 106, 107, 108, 110, 111, 116, 119, 121, 230, 231, 241, 281, 284, 285, 302, 306, 312, 314, 335, 356, 362, 363, 375, 376, 379, 380, 381, 383, 393, 397, 398, 455, 464
- moisture equivalent, 184, 192
- moisture release curve, 191, 192
- moisture stress, 302, 307
- molecular biology, 505, 510
- molecular marker, 95, 120
- Mollisol, 169, 192
- molybdenum, 208, 328
- monoculture, 44, 60, 62, 63, 65, 66, 70, 221, 315, 470
- Montgomery, 60, 355
- montmorillonite, 164, 165, 387
- morphological plasticity, 58, 70, 84
- mortality, 56, 246, 288
- mountain ash, 183
- multilines and blends, 95
- multiple cropping, 16, 473, 493
- multiple nutrient deficiencies, 478
- N balance, 38, 210, 468
- N fixation, 10, 13, 64, 180, 208, 209, 210, 211, 213, 214, 220, 259, 300, 301, 318, 328, 330, 446, 466, 468, 479, 480, 503
- NAR, 50
- national energy use, 419
- native vegetation, 167, 478, 480
- nature reserves, 452, 490
- NDF, 25, 26, 327
- NE, 34, 35, 36, 39, 43
- neem, 224
- NER, 12, 416, 428, 429, 432, 435, 508
- net assimilation rate, 50
- net energy, 34, 35, 42, 296, 416, 428, 435, 503
- net energy ratio, 416, 428, 435, 503
- net primary production, 28, 43, 195
- net radiation, 136, 235, 236, 241
- neutral detergent fiber, 25, 26
- NFE, 25, 26
- niche concept, 59, 70
- niche differentiation, 59, 60, 61, 62, 63, 64, 65, 288

nitrapyrin, 206	pasture, 11, 14, 15, 17, 27, 30, 38, 40, 48, 54, 63, 65, 72, 102, 114, 117, 174, 180, 191, 211, 213, 217, 218, 219, 221, 224, 271, 274, 288, 349, 352, 358, 367, 368, 369, 394, 444, 445, 446, 481, 493, 497
nitrate reduction, 196, 207, 208, 300, 309	pea, 64, 72, 97, 114, 211, 215, 259, 368, 447
nitrification, 179, 196, 197, 203, 204, 205, 206, 207, 228, 337, 447	peach, 404
nitrite, 197, 203, 206	peanut, 211, 259, 312, 316, 317, 425
<i>Nitrobacter</i> , 203, 226	pedotransfer function, 324, 357
nitrogen cycle, 196, 197, 215	Penman, 147, 232, 234
nitrogen fertilizer, 228, 329, 337, 467	PEP carboxylase, 264, 270
nitrogen fixation, 196, 213	persistence, 5, 65, 112, 114, 115, 117, 274, 283, 358, 480
nitrogen mineralization, 202	pest, 16, 18, 64, 79, 81, 87, 89, 367, 382, 448, 459, 464, 466, 473, 475, 480, 482, 491, 494, 505, 507
nitrogen supply, 333	pesticides, 16, 321, 341, 423, 425, 458, 467, 475, 478, 480, 481, 482, 498, 499, 510
nitrogenase, 208, 210, 228	pH, 61, 66, 68, 70, 77, 160, 163, 164, 173, 176, 177, 178, 179, 180, 181, 191, 192, 200, 202, 203, 204, 206, 207, 210, 211, 212, 220, 221, 321, 324, 326, 332, 357, 386, 387, 408, 452, 478
nitrogen-free extract, 26, 43	phenology, 96, 121, 283
nitrogen-use efficiency, 285, 291	phenophase, 97, 106, 107, 108, 109, 111, 112, 119, 122, 393
nitrous oxide, 16, 154, 227	phenostage, 97, 99, 110, 122, 471
no till, 15	phenotype, 77, 83, 95, 311, 314, 316
non-renewable energy, 412	photoinhibition, 267, 291
non-structural carbohydrate, 25, 26, 200, 273	photoperiodism, 100, 101, 103, 107, 122
non-structural material, 24, 25	photorespiration, 207, 263, 264, 266, 274, 275, 291, 292
non-uniformity principle, 22, 215, 370, 383	photosynthesis types, 53, 276
NUE, 12, 285	photosynthetically active radiation, 52, 53, 70, 127
nutrient cycling, 168, 504	photothermal unit, 106, 111, 122
nutrient extraction, 443, 457, 490	phyllchron, 98, 122
nutritional control, 305, 319	phytochrome, 101
	pineapple, 255, 265, 290
oat, 72, 73, 104, 107, 115, 116	plant density, 44, 53, 55, 57, 58, 61, 90, 283, 311, 315, 360, 465
ocean, 130, 151, 153, 154, 199, 328, 385, 408, 411, 446	plant nutrient, 30, 191, 323, 327, 333, 334, 357, 425
oilseed, 359, 364, 426, 430, 467, 502, 512	plasticity, 57, 58, 309, 311, 314, 315
olive, 286, 397	plowing, 15, 166, 342, 343, 346, 351, 357, 407, 414, 420, 443, 466
onion, 107	pollination, 82, 95, 310, 311, 464
optimization, 61, 119, 271, 317	pollution, 5, 7, 21, 204, 205, 206, 219, 223, 348, 349, 386, 481
optimum patterns, 367	polyculture, 44, 60, 61, 62, 63, 64, 65, 69, 70, 287
optimum switchover, 100, 122	population, 7, 8, 9, 13, 16, 18, 21, 22, 36, 37, 38, 39, 40, 71, 74, 75, 76, 77, 81, 83, 95, 97, 174, 201, 215, 217, 248, 283, 296, 381, 384, 400, 411, 424, 433, 434, 435, 437, 438, 456, 458, 464, 473, 481, 484, 485, 486, 487, 488, 490, 491, 492, 493, 494, 495, 497, 502, 508, 509, 510
orange, 326	population growth, 174, 438, 473, 481, 484, 490, 491, 509, 510
organic farming, 16, 204, 217, 224, 226, 228, 494, 500	potassium, 176, 224, 226, 309, 337, 417
osmoregulation, 376, 383	potato, 37, 38, 48, 72, 73, 74, 92, 107, 257, 258, 259, 279, 302, 303, 306, 307, 426, 487
osmotic adjustment, 231, 245, 255, 271, 374, 375, 376	
osmotic potential, 183	
overlap cropping, 65	
Oxisol, 173, 192, 480	
P fixation, 355, 478, 483	
packing density, 182, 192	
paddy soil, 472	
PAR, 52, 53, 70, 127, 132, 133, 158, 265, 266, 275, 287	
parent material, 159, 162, 164, 171, 179, 190, 192, 199, 227, 331, 385, 386	
partial root zone drying, 403, 404, 410	
partitioning, 24, 43, 51, 75, 89, 119, 147, 193, 233, 236, 292, 304, 305, 306, 307, 308, 309, 311, 312, 314, 317, 318, 431, 505	

- potential evapotranspiration, 152, 232, 241
- potential production, 52, 356
- potential sink capacity, 362, 383
- potential yield, 11, 356, 464, 492
- PRD, 403, 404, 409, 410
- Priestley–Taylor, 234
- primary minerals, 162, 163, 164, 176, 190
- primary production, 9, 29, 39, 41, 42, 50, 138, 318
- primary tillage, 332, 343, 344, 357
- production processes, 3, 7, 193
- production value, 72, 296, 297, 319, 363, 364
- productive structure, 50, 51, 70, 284
- Propionibacterium*, 204
- protein, 25, 26, 27, 31, 32, 34, 35, 37, 38, 39, 40, 41, 53, 71, 72, 73, 77, 86, 94, 104, 180, 195, 208, 214, 217, 220, 227, 259, 292, 294, 295, 299, 300, 317, 318, 325, 330, 335, 341, 429, 461, 462, 463, 464, 465, 487, 492, 493, 495, 497
- proximate analysis, 26, 43
- Pseudomonas*, 204
- puddled soil, 410
- puddling, 400, 414, 472, 474, 483
- pure line, 83, 84, 92, 97
- PV, 296, 297, 298, 299, 306, 319, 363, 364
- pyrolysis, 298, 426, 508
- Q₁₀, 189, 318
- QTL, 95
- qualitative trait, 77, 86
- quantitative trait, 77, 86, 87, 95, 304
- quantitative trait loci, 77, 95
- quantum efficiency, 263, 266, 267, 270
- quantum requirement, 263, 291
- quinoa, 512
- radiation balance, 131, 134, 135, 136, 155, 157, 187, 234
- radiation-use efficiency, 13, 49, 52, 70, 266, 279, 283
- radish, 107, 295, 430, 512
- rape, 103, 368
- RAW, 185, 192, 395
- RDA, 39
- RDI, 403, 404, 409, 410
- readily available water, 185, 395
- recycling, 27, 29, 165, 199, 217, 219, 220, 221, 294, 357, 404, 500
- redox potential, 162
- reference evapotranspiration, 232, 234
- regulated deficit irrigation, 403, 404
- relative growth rate, 47, 70
- relative humidity, 141
- relative reproductive rate, 81
- relative yield total, 61, 70
- remote sensing, 18, 325, 420, 454, 457, 510
- renewable energy, 412
- replacement, 8, 15, 40, 44, 60, 80, 348, 357, 361, 398, 400, 406, 416, 443, 446, 475, 485, 490, 497
- replacement fertilization, 357
- reproduction, 23, 74, 78, 80, 82, 92, 95, 96, 101, 112, 122, 170, 361, 466, 497, 506
- resource recovery efficiency, 483
- respiratory quotient, 293, 319
- response farming, 381, 383
- response to environment, 3, 96, 114, 116, 272, 281, 318, 383
- reverse osmosis, 503
- R_g, 292, 294, 296, 297, 299, 300, 302, 303, 317, 318
- RGR, 47, 50, 69, 70
- rhizobia, 209, 210, 211, 212, 226, 228, 328
- Rhizobium*, 210, 211
- Rhodes grass, 264, 512
- ridge culture, 358
- risk averse, 14, 450, 457
- risk management, 64, 450
- R_m, 292, 294, 295, 296, 299, 300, 301, 302, 303, 312, 317, 318
- R_n, 136, 137, 138, 139, 140, 141, 142, 145, 146, 147, 148, 149, 151, 152, 157, 187, 188, 234, 235, 236, 241, 246, 260, 346
- root crop, 314, 361, 418
- root depth, 238, 239, 374, 375
- root exploration, 370, 375
- root length density, 237, 238, 242, 245, 371, 479
- root nodules, 208, 478
- root systems, 61, 113, 181, 185, 237, 238, 242, 243, 248, 249, 251, 295, 339, 340, 347, 360, 367, 370, 395, 504
- rubisco, 263, 264, 270, 272
- RUE, 12, 49, 70, 266, 279, 280, 290
- rumen, 32, 43
- runoff, 163, 199, 204, 205, 216, 223, 225, 230, 233, 336, 344, 346, 347, 351, 352, 354, 356, 360, 371, 382, 385, 386, 390, 392, 403, 406, 409, 410, 461, 468, 470, 504
- rutabaga, 338
- rye, 78, 104, 330, 331
- ryegrass, 49, 101, 107, 139, 146, 205, 217, 219, 288, 296, 367
- RYT, 61, 70
- safflower, 73
- saline soil, 406, 407, 410
- salinity, 19, 191, 224, 267, 324, 332, 387, 388, 389, 390, 391, 394, 401, 405, 406, 407, 408, 409, 446, 452, 453, 454, 457
- salinization, 14, 20, 384, 391, 404, 446, 452, 453, 454, 457, 504
- SAR, 176, 192, 387, 410
- SDP, 101, 102, 103, 107, 111
- Second Law of Thermodynamics, 161
- secondary mineral, 159, 162, 163, 164, 166, 190

seed bank, 112, 114, 115, 116, 117, 361, 383, 506	SOM, 166, 167, 168, 169, 170, 171, 175, 176, 179, 192, 195, 196, 197, 199, 201, 202, 203, 204, 213, 217, 224, 227, 324, 326, 342, 466, 468, 475, 483, 508
seed bed, 115, 118, 202, 342, 343, 344	sorghum, 26, 27, 51, 64, 73, 78, 103, 198, 235, 246, 249, 250, 259, 268, 295, 298, 299, 327, 331, 345, 370, 374, 375, 376, 377, 430, 477, 480, 513
seed treatment, 464, 466	source–sink relations, 305
seedling establishment, 113, 114, 117, 122, 396, 474	soybean, 15, 17, 18, 26, 27, 28, 34, 50, 73, 77, 79, 86, 99, 101, 102, 103, 107, 118, 120, 198, 212, 213, 220, 240, 246, 249, 267, 299, 300, 318, 327, 344, 353, 355, 358, 421, 423, 426, 427, 437, 459, 460, 461, 462, 463, 465, 466, 468, 476, 477, 478, 479, 480, 481, 507
selection, 13, 45, 54, 62, 69, 74, 75, 76, 77, 78, 80, 82, 83, 84, 87, 92, 94, 95, 101, 102, 118, 248, 249, 255, 269, 297, 314, 316, 317, 318, 360, 363, 379, 382, 385, 420, 462, 463, 464, 466	SPAC, 203
self-thinning, 56, 57, 58, 70	spatial variability, 84, 172, 220, 354, 356
semi-dwarf, 18, 19, 87, 447, 472, 483	specialization, 483
sensible heat, 137, 140, 144, 147, 236, 351	species diversity, 73
sere, 44, 70	specific growth rate, 69, 306
sesquioxide minerals, 166, 176, 191	specific heat, 138, 144, 234
similarity principle, 144	specific hybrids, 82, 95
simplification, 242, 461, 483	specific leaf area, 50, 70, 272, 291
sink capacity, 306, 319, 363, 364	specific leaf mass, 50, 273, 283
site-specific management, 18, 324, 357, 504	specific resistance, 84
SLA, 50, 70, 272	spinach, 107
SLM, 50, 70, 272, 273, 285	spray, 86, 359, 385, 409, 410, 422, 503
smart machine, 501	spring wheat, 105, 107, 110, 111, 119, 120, 374
smectite, 164, 173	sprinkler, 150, 352, 396, 397, 399, 400, 401, 407, 409
SNU, 41, 43, 71, 487, 493, 502	sprinkler irrigation, 150, 352, 397, 399, 400, 401, 407
sodium adsorption ratio, 176, 192, 387	squash, 73
SOI, 448, 449, 457	SSM, 324, 325, 326, 357, 504
soil acidity, 178, 181, 192, 367, 478, 483	stability, 5, 7, 9, 14, 18, 19, 20, 22, 84, 89, 164, 177, 192, 255, 373, 437, 464
soil aeration, 181, 185, 186, 192	stabilization, 510
soil aggregate, 197, 202, 351	stage 1, 236, 237, 241, 261
soil evaporation, 193, 229, 236, 241, 250, 258, 261, 360, 362, 373, 379, 382, 391, 397, 441	stage 2, 236, 237, 241, 261
soil fertility, 15, 20, 87, 330, 443, 448, 476, 478, 482	stand establishment, 341
soil formation, 45, 162, 179, 348, 357, 461	standard nutritional unit, 41, 43
soil horizon, 192	standard of living, 414, 416, 433
soil management, 8, 10, 13, 20, 171, 321, 325, 355, 356, 463, 470, 478, 482	stay-green, 464, 483
soil microorganism, 115, 178, 227, 505	steady state, 167, 390, 429
soil mineral, 182, 330, 470, 500	Stefan–Boltzmann, 126, 129, 137, 158
soil order, 172	stocking rate, 66, 218, 369
soil organic matter, 44, 66, 90, 166, 167, 168, 192, 272, 329, 372, 400, 444, 445, 446	stoichiometry, 24
soil structure, 15, 165, 175, 186, 220, 221, 359, 372, 420, 472	strategies, 9, 30, 149, 153, 255, 261, 284, 317, 358, 367, 369, 374, 377, 378, 381, 383, 404, 421, 439, 441, 442, 447, 450, 451, 452, 473
soil temperature, 51, 138, 187, 188, 189, 236, 343, 345, 346	strategy, 13, 41, 99, 150, 249, 252, 255, 261, 272, 363, 369, 376, 379, 380, 383, 385, 391, 431, 441, 450, 498
soil texture, 162, 236, 324, 347	strawberry, 102
soil type, 45, 84, 153, 192, 236, 370, 373, 377, 403, 420, 445, 446, 472	strip cropping, 357
soil-borne disease, 367, 371, 383, 443, 446	structural, 4, 24, 25, 34, 43, 186, 294, 318, 327, 450, 485
soil–plant–atmosphere, 193, 229, 243, 261	
solar altitude, 49, 127, 129, 132, 133, 281, 282	
solar constant, 130, 156	
solar radiation, 7, 12, 18, 48, 51, 52, 70, 130, 132, 134, 138, 139, 154, 243, 262, 283, 326, 344, 360, 421, 423, 460, 465, 468, 471, 482	
solstice, 130, 158, 187	
solubility product, 160, 164, 165, 192	

- stubble management, 377
- stubble retention, 377, 378, 383
- stubble-mulch system, 351
- subirrigation, 394, 410
- subsistence agriculture, 4, 416, 424
- subsurface drip, 398, 401, 410
- succession, 44, 45, 70, 199, 200
- sudan grass, 146, 147
- sufficiency, 7, 8, 22, 39, 356
- sugarbeet, 57, 73, 107, 283, 285, 308, 314, 333, 334, 341, 389, 427, 428
- sugarcane, 15, 73, 74, 82, 83, 91, 92, 199, 210, 265, 426, 427, 428, 429, 458, 461, 496, 508
- sulfur, 160, 169, 176, 181, 199, 224, 408
- Sun, 23, 125, 126, 127, 128, 129, 130, 131, 132, 134, 150, 156, 157, 411
- sunflower, 6, 27, 48, 73, 99, 107, 108, 242, 251, 252, 253, 254, 258, 259, 270, 273, 278, 279, 280, 285, 310, 362, 363, 366, 370, 423, 426, 427, 468
- superphosphate, 336
- support energy, 17, 22, 40, 374, 415, 428, 432, 433
- surface irrigation, 20, 394, 395, 396, 397, 399, 405
- sustainability, 5, 7, 8, 9, 10, 14, 22, 92, 180, 323, 348, 349, 355, 356, 400, 451, 452, 455, 459, 468, 475, 480, 483, 500
- sustainable agriculture, 5, 456
- swidden agriculture, 180
- swine, 28, 32, 37, 215, 221, 270, 424, 497
- switchgrass, 431, 502
- symbiosis, 44, 212, 228, 478, 502
- synthesis gas, 426, 435
- synthetic cultivar, 82, 121
- T_a*, 138, 139, 141, 144, 146, 147, 148, 149, 151
- tactical application of nitrogen, 457
- tactics, 13, 45, 74, 358, 367, 380, 381, 383, 402, 439, 441, 447
- TDN, 32, 33
- TDS, 386, 387, 406, 410
- technological advance, 18, 349, 458, 459, 483, 484
- technological change, 5, 18, 437, 461
- technological innovation, 18, 439, 456, 457
- technology transfer, 450, 457
- thermal conductivity, 187, 188, 191, 346
- thermal radiation, 125, 137
- thermal unit, 109, 110, 114, 121
- thermodynamic, 161
- Thiobacillus*, 204
- tillage implements, 341, 343, 415
- tillering, 58, 97, 246, 276, 309, 315, 316
- timeliness, 19, 345, 347, 497, 501
- Timothy grass, 513
- tobacco, 107, 279, 286
- tolerance, 20, 64, 68, 76, 78, 79, 81, 210, 245, 255, 256, 261, 318, 329, 348, 349, 357, 359, 388, 389, 390, 400, 405, 409, 474, 510
- tolerance to erosion, 348, 349, 357
- tomato, 99
- topography, 15, 153, 157, 162, 171, 394, 396, 446
- total digestible nutrients, 32
- total dissolved salts, 410
- toxins, 79, 499
- tractor, 36, 325, 343, 416, 474
- transgenic, 16, 18, 78, 79, 85, 86, 91, 95, 256, 325, 420, 423, 448, 465, 466, 474, 475, 480, 481, 482, 483, 497, 498, 500, 506, 507
- translocation, 274
- transpiration efficiency, 261, 270, 272, 290, 360, 467
- transport, 5, 8, 10, 17, 115, 137, 140, 144, 145, 154, 157, 158, 223, 253, 255, 262, 274, 276, 292, 294, 297, 304, 305, 345, 349, 414, 416, 417, 424, 425, 426, 427, 428, 433, 442, 478, 501, 507
- transport coefficient, 144, 158
- transportation, 23, 40, 413, 430, 435
- trees, 57, 65, 92, 143, 165, 168, 174, 183, 231, 286, 288, 351, 397, 398, 429, 430, 441, 442, 452
- trellis, 286
- trophic chain, 23, 28, 29
- trophic efficiency, 30, 35, 37
- trophic web, 29
- tuber crop, 361, 426
- turbulent transport, 144, 145, 146, 148, 150, 152
- Typic Haplaquoll, 172
- Ultisol, 192, 479, 480
- universal soil loss equation (USLE), 352, 353, 357
- uptake capacity, 205, 243, 309, 357, 480
- urban and rural populations, 510
- urea, 180, 207, 221, 225, 337, 338
- ureaformaldehyde, 206
- vapor pressure, 140, 141, 142, 147, 151, 158, 183, 234, 243, 249, 253, 254, 259, 362, 363, 408
- vaporization, 137, 140, 149, 158, 503
- variability, 18, 20, 84, 119, 153, 155, 220, 227, 243, 323, 324, 347, 361, 369, 375, 380, 383, 439, 441, 443, 451, 455
- vegetable crops, 56, 91, 108, 334
- vegetation buffer zone, 483
- vernalization, 78, 88, 100, 102, 104, 105, 106, 107, 115, 120, 121, 122, 365
- vertical resistance, 84, 94
- Vertisol, 192
- vesicular-arbuscular, 210
- vetch, 211
- volatilization, 197, 204, 205, 207, 225, 228, 338, 468, 474, 504
- VR, 84, 94, 95

wall material, 24, 25, 26, 31, 32, 295, 307, 330	wheat production, 362, 379, 437, 439, 443, 449, 457, 481
water content, 113, 141, 159, 165, 181, 182, 183, 184, 185, 186, 188, 191, 229, 230, 231, 233, 238, 239, 240, 241, 242, 261, 372, 373, 377, 380, 395, 402, 427	wheat zone, 441, 455
water holding capacity, 243, 324, 340, 378, 396, 403, 410	wild flooding, 394, 410
water potential, 182, 185, 191, 229, 230, 231, 237, 238, 239, 240, 242, 243, 251, 254, 255, 260, 402	wilting point, 185, 191, 192, 238, 239, 396
water spreading, 394, 409, 410	wind, 115, 125, 139, 140, 142, 143, 144, 145, 146, 147, 148, 149, 150, 156, 286, 343, 344, 346, 348, 351, 357, 397, 411, 412, 413, 433, 441, 444, 506
water supply, 9, 14, 60, 61, 220, 232, 234, 243, 245, 248, 249, 256, 266, 272, 276, 277, 321, 354, 358, 360, 362, 368, 369, 371, 375, 384, 385, 386, 392, 393, 394, 395, 399, 401, 404, 416, 454, 466, 468, 493, 494	winter wheat, 105, 106, 107, 327, 346, 365
water table, 21, 204, 213, 347, 386, 391, 394, 396, 446	work of farming, 413
water use, 7, 119, 229, 231, 232, 238, 239, 241, 242, 243, 245, 249, 250, 253, 255, 257, 260, 271, 360, 361, 362, 364, 365, 366, 367, 368, 370, 375, 382, 383, 385, 391, 392, 397, 400, 408, 409, 429, 445, 453, 503, 509, 510	world energy use, 412
water-limited yield, 448	world food, 41, 219, 269, 409, 425, 437, 482, 494, 496, 508
waterlogging, 20, 396, 410	world population, 4, 13, 16, 39, 214, 219, 256, 384, 432, 485, 490, 500, 508
water-use efficiency, 20, 255, 257, 261, 361, 367, 368, 382, 391, 392, 397, 398, 399, 404, 408, 410, 430, 442, 457, 495	WP, 185, 186, 191, 192, 395
weather forecasting, 402, 510	WUE, 12, 408
weathering, 163, 166, 178, 192, 199, 216, 227, 348, 386, 500, 504	Y _g , 296, 297, 306, 312
weed, 16, 20, 42, 51, 52, 65, 79, 86, 87, 114, 115, 116, 117, 215, 222, 226, 283, 321, 341, 342, 343, 344, 345, 359, 360, 367, 370, 371, 379, 380, 382, 396, 400, 420, 422, 423, 466, 472, 474, 480, 491, 506	yield component, 309, 310, 312, 318, 432
weed control, 20, 65, 86, 215, 226, 321, 341, 342, 343, 344, 345, 359, 360, 367, 370, 379, 396, 420, 423, 474, 480, 491, 506	yield forecast, 334, 335, 457
Wein, 129, 156	yield gain, 90, 93, 95, 431, 454, 459, 463, 473, 482, 495, 509
wet and dry deposition, 180, 214, 215, 217	yield gap, 365
wet bulb, 141, 158	yield increase, 11, 13, 88, 90, 100, 249, 378, 451, 455, 465, 467, 482, 493
	yield plateau, 473, 483
	yield stability, 18, 19, 246, 253, 442, 443, 457, 462, 463, 464, 501
	yield variability, 119, 374, 454, 457
	yield variation, 19, 326, 365
	yield-area, 41
	zenith angle, 127, 158
	zero till, 15, 18, 117, 378, 422, 447
	zonal, 171, 192
	γ, 142, 159, 234
	ΔG, 161
	ΔH _c , 26, 33, 36