Index
Africa, 75, 81
Agricultural Conservation Program (ACP), 160-161
agricultural land benefits, 13, 56-61
agricultural technology, 15-16, 139
alternative cropping systems, 111-117
communication of, 141-144
conservatism of, 15
factors affecting adoption of, 137-148
Federal research on, 186-188
information diffusion on, 140-141
limitations of, 93
limited innovation in, 14-15
misapplication of, 93
organic agriculture, 107-111
role of government in, 16-19, 151-177
air quality, 57-58
Alabama, 43
Alaska, 67, 68, 143, 162, 189
Aleutian Islands, 223
condition of rangeland in, 70
landownership in (table), 222
State Agricultural Experiment Station, 222
State Department of Natural Resources, 222
University of, 223
virgin lands in, 220-224
alfalfa, 48, 75, 108, 118, 205
Algeria, 37
4-amino 3,5,6-trichloropicolinic acid [see picloram]
aquifers
biodegradation of organic materials in, 53
Carizzo, 51
definition of, 48
Estancia Basin, 51
Ogallala Formation, 50-51, 52
recharging of, 48, 59
Roswell Artesian Basin, 51
Seymour Formation (Texas), 53
Arizona, 49, 69
Arkansas, 49
Arkansas River Valley [Arizona], 120
Aroostook County (Maine), 33
arsenic, 2
Asia Minor, 37
Banks for Cooperatives, 154
barley, 32, 100, 112, 120, 220
benching, 127
bermudagrass, 100
blueberries, 52
Brannon, Charles F., 171
Brickner, Ernie, 195, 196, 212-214
Brown, Dr. Paul, 216, 217, 219
buffalo gourd, 115
Bulgaria, 123
Bureau of Land Management (BLM), 67, 70, 161,
163-166, 203-205
cadmium, 232
calcium, 35, 59, 79
California, 43, 44, 47, 49, 52, 55, 56, 68, 69,
112, 118, 163
Canada, 47, 143
canola, 220
carbon dioxide, 57
carbon monoxide, 57
Caribbean, 24, 33
Center for Agricultural and Rural Development
(CARD), 145, 238
centrifugal pump, 92
cheatgrass, 69
Chevron Chemical co., 197-199
chisel planting, 97
chlorinated hydrocarbons, 52
chlorine, 231
Cihylik, Nicholas, 195, 197-199
Coastal Plains States, 44
Colorado, 49, 60
Colorado River, 47, 54
Commodity Credit Corp., 151
commodity policies, 153-154
commodity programs, 151
computers, 121-122, 142
Congress, 162, 163
acts of (see legislation)
issues and options for, 181-191
legislation for Federal rangelands, 71, 76
major legislation establishing Federal role in
resource conservation (table), 158-160
opportunities for action by, 18-19
conservation
Agricultural Conservation Program (ACP), 168-170
coordination of commodity and credit programs
with, 176
cross compliance as a strategy for, 171-172
in farming, 206-211
Federal cost sharing in, 167-172
Federal role in, 157-161
Great Plains Conservation Program (CP CP), 170-171
improving effectiveness of Federal programs for,
183-186
influence of type of farm ownership on, 138-139
in Iowa, 174
National Association of Conservation Districts,
174, 176
in Oregon, 174-175
Soil Conservation Association, 173
Soil Conservation Districts, 173
State initiatives in, 173-175, 190-191
conservation tillage, 14, 31, 44, 94-107, 129, 147
adoption rate of, 97-98
barriers to adoption of, 100-105
characteristics of, 95-96
economic incentives for adoption of, 98-100
Federal role in, 105-106
herbicide use in, 94-95
major methods of, 97
and no-till farming, 95-107
contour farming, 14, 124
Control Data Corp., 122
copper, 232
Copper River (Alaska), 222
corn, 31, 34, 43, 92, 95, 100, 108, 110, 118, 220
Corn Belt, 33, 35, 38, 45, 108
Cortez, 115
Cote, David, 198
cotton, 32, 33, 43, 95, 118
cranberries, 52
credit programs, 154-156
crested wheatgrass, 75
cropland, 14-15, 46, 91-133
area in United States, 14, 91
conversion of virgin land to, 220-224
conversion of wetlands to, 9
erosion control technologies for, 123-127
growth of, 30-32
potential in United States, 220-224
productivity-sustaining technologies for, 92-123
sustaining productivity of, 13-15
crops
abandoned or neglected types of, 115
genetics of, 114, 115
polyculture of perennial plants, 115-116
potential new, 114-117
residue management, 15, 58
rotation of, 108, 125
salt-tolerant, 47, 119-121
species under cultivation, 114
2,4-D, 52
dams, 123
data bases, 238-242
DDT, 52
Delaware, 112
disaster relief, 151, 153-154
disk planting, 97
Dodd, Harold, 208
Dodge, Ted, 218, 219
drainage
benefits of, 9, 38-41
effects on wildlife, 60
investment in systems for, 41
methods of, 9, 38, 41
research on, 41
Ellenberger, Glen, 198
Environmental Protection Agency (EPA), 105, 119, 147, 165, 166, 231
environmental protection
environmental impact assessment, 166-167
nonpoint source pollution, 165-166
pesticide regulation, 165
erosion, 7-8
areas with high rates of, 32-33
causes of, 24-25
characteristics of land most subject to, 23-24
control of, 123-130
of croplands, 8, 24, 25
effects on crop production, 34-36
of fragile lands, 188-190
gully, 23, 37, 92
magnitudes of, 25-32
of rangeland, 27
rill, 23, 25-27, 30, 32, 33, 36, 37, 92, 123, 169
as a self-reinforcing process, 24, 37
sheet, 23, 25-27, 30, 32, 33, 36, 37, 92, 123, 169
from snowmelt runoff, 24-25
streambank, 23, 37, 92
Universal Soil Loss Equation (USLE), 24
water-caused, 7-8
wind, 7, 24, 25-26, 27, 32, 37, 92, 126, 170
eutrophication, 59
Farmers Home Administration (FmHA), 147, 154-155
loan programs of, 185
farm rehabilitation, 212-214
Fast Agricultural Communications Terminal Systems (FACTS), 122
Federal Agricultural Conservation Program, 137
Federal Credit System [FCS], 154
Federal Intermediate Credit Banks (FICBS), 154
Federal Land Banks, 154
fertilizers, 34, 35, 42, 107
fish and wildlife
in Alaska, 223
effects of agricultural activities on, 59-61
effects of overgrazing on, 69
wild burros, 76, 163
wild horses, 76, 163
fish (see fish and wildlife)
flexible cropping, 48
Florida, 56
fluometuron, 52
forests
detrimental effects of grazing in, 82
extent of grazing in Eastern, 82-84
technologies for multiple-use management of
grazing in, 85-86
Franklin, Benjamin, 115
Fuelbirt, John, 210
Galapagos Islands, 121
Gallup, Dwight, 206-211
Gallup, Hazel, 210
Gallup, Roger, 195, 196, 206-211
gasohol, 152, 153
General Accounting Office (GAO), 53, 162, 164, 165, 168, 170, 172
Georgia, 37
Germany, 42
Gila River (Arizona), 120
glossary of terms used in this report, 249-258
Godel, Ed, 212, 213
grasses, 115, 116
grazing
in Eastern forests, 82-84
effects on wildlife, 60-61
excessive, 13, 27
Savory method of, 80
short duration, 80-82
Grazing Service, 161
Great Lakes States, 38
Great Plains, 37
Great Plains Conservation Program, 161
Green Thumb, 142
Greiss, Alan, 199
ground water
allocation of, 49
availability and quality of, 48, 49
contamination of, 52-53
definition of quality of, 53-54
degradation of, 51, 54
depletion of, 11, 48-54
overdraft of, 49
as percent of total freshwater resources, 49
policies toward surface water and, 54
protection of, 11
saltwater contamination of, 51-52
streamflow reduction from pumping of, 53-54
growth regulators, 107
Gulf of Mexico, 120
Hanford, Howard, 195, 196, 215-219
Harris Poll, 167
Hawaii, 32
hay, 34, 43
herbicides, 100
application rates for various crops, 95
in brush control, 78
contamination of ground water by, 52
Highwood Alkali Control Association, 215
Holzer, Jane, 218, 219
hydrocarbons, 57
IHMS (see Integrated Brush Management Systems)
Idaho, 32
Illinois, 33, 101, 112
Indiana, 101, 112, 122
information diffusion, 140-141
insecticides
effects on birds, 60
effects on fish, 60
Integrated Brush Management Systems (IBMS), 77-80
intercropping, 112
International Institute of Applied Systems Analysis, 238
Iowa, 33, 34, 101, 140
Iraq, 37
irrigation, 34, 50, 58, 92
area of farmland under, 117
drip systems for, 117-119
effects on wildlife, 60
soil salinization from, 10, 46-48
in the Southwest, 48
Italy, 37
Japan, 93, 123
Jefferson, Thomas, 125
johnsongrass, 100
jojoba, 115
Kansas, 49
Kentucky, 112, 122
Kentucky Cooperative Extension System, 142
Kindschy, Bob, 201, 203
Lake Erie, 102
land productivity
effect of erosion on, 34
problems, 7-14
role of government in, 151-177
Laurance, Max, 203
lead, 232
legislation
Agriculture and Food Act of 1981, 151
Alaska Lands Bill, 67
Appalachian Regional Development Act, 161
Archaeological and Historic Preservation Act of 1974, 161
Classification and Multiple Use Act of 1964, 71
Clean Air Act of 1963, 161
Clean Water Act of 1977, 165-166
Endangered Species Act of 1973, 161
Federal Environmental Pesticide Control Act of 1972, 161
Federal Insecticide, Fungicide, and Rodenticide Act of 1947, 165
Federal Land Policy and Management Act of 1976, 71, 161, 163
Federal Water Pollution Control Act of 1972, 161, 165-166, 190
Food and Agriculture Act of 1977, 153
Food and Drug Act, 123
Forest and Rangeland Renewable Resources Planning Act of 1974, 71, 161, 163-164
Forest and Rangeland Renewable Resources Research Act of 1978, 164
Forest and Rangeland Resources Extension Act of 1978, 161
Multiple Use-Sustained Yield Act of 1960, 161, 162
National Environmental Policy Act of 1969, 161
National Forest Management Act of 1976, 161, 164
organic Act of 1897, 162
Public Rangeland Improvement Act of 1978, 71, 75, 161, 163
Renewable Resources Extension Act of 1978, 164-165
Resources Conservation Act (RCA) of 1977, 98, 106, 171, 182, 243-246
Resource Planning Act (see Forest and Rangeland Renewable Resources Planning Act of 1974)
Resource Planning Act of 1980, 67
Soil Conservation Act of 1935, 158
Soil Conservation and Domestic Allotment Act of 1936, 160
Soil and Water Resources Conservation Act of 1977, 161, 162
Tax Reform Act of 1976, 156, 157
Taylor Grazing Act of 1934, 161, 162
Watershed Protection and Flood Prevention Act of 1954, 161
Wilderness Act of 1964, 161
Wild Horse and Burro Act of 1974, 161
legumes, 75
lentils, 32
indane, 52
magnesium, 59
Maine, 33, 52
Maryland, 106, 112
Massachusetts, 52
Matanuska River (Alaska), 222
mathematical models
econometric, 235
Iowa State University Linear Programming Model (ISU-LP), 236-237
necessary elements for policy analysis, 236
phonological, 237-238
systems simulation, 235
Yield/Soil Loss Simulator, 237
mercury, 232
Mesopotamia, 37
mesquite, 69
Michigan, 122
Miller, Dr. Marvin, 215, 217
millet, 100
Minnesota, 42, 49
Mississippi, 24, 33, 43
Mississippi River, 213
Mississippi Valley, 33
Missouri, 33
Missouri River, 216
Morocco, 37
mulches, 126
multiple cropping, 14, 111-114
advantages and disadvantages of, 112-114
definition of, 111
in Mexico, 112
relay intercropping, 112
National Aeronautics and Space Administration (NASA), 223
National Agricultural Lands Study, 220
National Resources Inventory (NRI), 25, 30, 33, 91, 123, 124, 129, 138, 170, 183, 189
National Soil Erosion-Soil Productivity Research Planning Committee (see U.S. Department of Agriculture)
National Weather Service, 142
Nebraska, 49, 122, 123
Nevada, 49
New Mexico, 49, 51, 69, 78
nickel, 232
nitrates, 53
nitrogen, 35, 36, 42, 58, 79, 104, 109, 229-230, 231
inadequacy as a limiting factor on rangeland productivity, 75
oxides of, 57
North-Central States, 34, 38
North Dakota, 49
Northwest Territory, 213
no-till farming, 58, 197-199, 208
oats, 34, 43, 112, 220
Office of Management and Budget, 162
Office of Technology Assessment (OTA), 48, 98, 106, 153, 242
papers commissioned for this study, 247-248
Ohio, 101, 112, 143
Oklahoma, 47, 49, 78, 123
Oregon, 112
organic agriculture, 14, 107-111
attitudes toward, 107-108, 109
comparison with conventional farming, 109-110
definition of, 107
feasibility of, 110
future of, 110-111
livestock operations in, 108
research in, 110
oxygen, 57, 59
ozone, 57
Palouse Basin, 32-33
paraquat, 202
pastureland conversion to cropland, 27
erosion rate of, 26
Patuxent River [Maryland], 106
peas, 32
Pecos River (Texas), 120
Pecos Valley Artesian Conservancy District (New Mexico), 51
Pennsylvania State University, 198
pesticides, 34, 107
conservation tillage and, 104-105
effects on ground water, surface water, and precipitation, 231
effects on soil organisms, 12, 231-232
picloram (4-aminophenoxy-3,5,6-trichloropicolinic acid), 79
Index . 265

potatoes, 33, 42, 220
predators, 76
Production Credit Associations, 154
productivity
v. crop yields, 34
loss rates, 8
Puerto Rico, 33
Purdue University, 25
rangeland
area of, 13, 67, 70
brush control on, 77-80
condition of, 13, 68-70
effects of fire on, 79
erosion of, 27
Federal and private control of, 67-68
grazing on, 74, 80-82
legislation affecting, 71
livestock on, 72-74
management of, 14, 71-77
multiple use of, 76-77
noxious animals and plants on, 68-70, 75-77
productivity of, 14-15, 70, 71
products and services of, 14
technologies for, 71-86
vegetation on, 67, 74-75
RCA process, 162
Red River, 49
Rio Puerco Basin (New Mexico), 69
Roswell Artesian Basin (New Mexico), 51
Russia, 123
Sacramento-San Joaquin Delta, 46
safflower, 48
salinization, 10-11, 46-48, 120
consequences of, 10
control of, 10-11
saline seep, 47-48, 215-219
saltbush, 75
Salt Lake Valley (Utah), 68
San Francisco Bay, 46
San Joaquin River (California), 46, 47, 52, 120
Santa Cruz River (Arizona), 69
satellites, 143
Secretary of Agriculture, 151, 158, 170
Secretary of Interior, 161, 163
shelterbelts (see windbreaks and shelterbelts)
Sicily, 37
Skinner, Bob, 195, 196, 200, 201, 204
slot planting, 97
Small Business Administration, 147, 155
snapbeans, 100
soil
amendments, 122-123
area of wet, 38
capping of rangeland, 45
chemical composition of, 229-232
chemical weathering of, 12-13
compaction of, 9-10, 40, 42-46
conservatopmo, 19
corrosion of wetland to cropland, 38
drainage of, 38-42
effects on air quality, 57-58
effects of chemical changes on nutrition, 233
effects of toxic wastes on, 232-233
erosion of, 23-38
fertilizer effects on, 229-232
fertility management of, 126
fertilizer value of eroded, 36-37
formation rates of, 8, 36
nutrient depletion in, 12-13
organisms in, 12, 226-229
organic matter in, 12, 225-226
salinization of, 46-48
shingling of rangeland, 45
tolerable loss of, 36
T-values of, 36, 129
variables in productivity of, 225-234
wet soil prevalence, 38, 38
Soil Erosion Service, 158
Soil Science Society of America, 242
soil types (see also soil)
Brandon, 34
clay, 36, 43, 55
Grenada, 34
loess, 32, 34, 35
Memphis loam, 34
sandy loam, 43
sorghum, 33, 100, 116, 118
Souris River, 49
Southeastern Coastal Plain, 43
soybeans, 31, 42, 95, 100, 108, 110, 112
stripcropping, 126-127
strip tillage, 97
stubble mulch, 58
subsidence, 11, 55-56
causes of, 11, 55
cement of, 56
effects of, 11
sugar beets, 42
sulfur, 231
sunflower, 48
Susitna River (Alaska), 222
2,4,5-T, 79
Tanana River (Alaska), 220, 222
tax policies and programs, 156-157
technology (see agricultural technology)
Tennessee, 33, 34
tepary bean, 115
terraces, 15, 129, 208
for water erosion control, 123-124
Texas, 47, 49, 55, 69, 78, 81
Bigford Formation, 51
Black) and Prairie, 33
Dimmit County, 51
Kit Carson County 50
Trans-Pecos region of, 52
Zwala County 51
tiltle managemen, 15
till plant, 97
Today’s Electronic Planning (TELEPLAN), 122
tomatoes, 120, 121
toxaphene, 52
trace elements, 59
Trempealeau River, 213
Triangle Conservation District (Montana), 218
2,4,5-trichlorophenoxyacetic acid (see 2,4,5-T)
tumbleweed, 69
Tunisia, 37

University of Illinois, 209
University of Nebraska Agricultural Computer Network (AGNET), 122
Urquiaga, Dominique, 201
Urquiaga, Lazaro, 195, 196, 200, 202, 203, 204, 205
USDA (see U.S. Department of Agriculture)
Agricultural Research Service, 187, 188
Agricultural Stabilization and Conservation Service (ASCS), 79, 105, 153, 162, 168, 184, 188
Bureau of Chemistry (1894), 157
Committee on Soil Conservation, 173
conservation groups assisted by, 147
Conservation operations Program, 160, 161-162
Cooperative Extension Service, 147
Cooperative Research Service, 187
development of flexible cropping by, 48
Federal Extension Service, 140, 185
Land Ownership Survey, 138
National Soil Erosion-Soil Productivity Research Planning Committee, 34, 35, 36, 186
Soil Conservation Service (SCS), 24, 34, 36, 41, 84, 91, 97, 106, 158, 162, 183, 184, 185, 190, 220, 222, 223, 224

U.S. Forest Service (USFS), 67, 84, 162, 164
Working Group on Pesticides, 52
U.S. Department of Commerce, 84
U.S. Department of Defense, 162
U.S. Department of the Interior, 162
U.S. Fish and Wildlife Service, 67
U.S. Geological Survey (USGS), 50, 51, 56
Information on Water Data (catalog), 53
U.S. Water Resources Council, 52
Utah, 68

Virginia, 122
Virginia Tech Computerized Management Network (CMN), 122
Virgin Islands, 33

Washington (State), 32, 112
water budget, 50
water quality
effects of vegetation and soil on, 58-59
wheat, 31, 32, 47, 95, 108, 112, 116, 118, 120, 220
wheatgrass, 203
wildlife (see fish and wildlife)
windbreaks and shelterbelts, 15, 127
winged bean, 115
Wisconsin, 123
woodlands
grazing potentials for Eastern, 82-86

Yukon River (Alaska), 222
Yuma (Arizona), 47

zero tillage, 97
zinc, 232