

Contents

Introduction Liz Carlisle and Aubrey Streit Krug	1
I. FOREST	
Forest Liz Carlisle and Aubrey Streit Krug	11
Throw It Upwards Leah Penniman	17
Tree-Range Chicken Reginaldo Haslett-Marroquin	25
The Cactus Forest Gary Paul Nabhan	31
A Food Forest for Southeast Atlanta Kelsi E. Bowens with Rosemary W. Griffin	39
Neighbors Megan Kaminski	45
From the Fringe Keefe Keeley	47
In the Presence of an Olive Tree Omar Tesdell	53
Makwa-Miskomin: Bear's Red Berry Wendy Makoons Geniusz	57
The Odyssey of Coffee Ivette Perfecto	63

Fruit Finding Eliza Greenman with Bill Davison	71
Elderberry Season Jesse Smith	79
Hazel-Bush and Willow Fred Iutzi	85
II. GRASSLAND	
Grassland Liz Carlisle and Aubrey Streit Krug	93
Landscapes of Abundance Rosalyn LaPier	97
Prairie Sonnet Gwen Nell Westerman	105
They Could Hear the Buffalo Elsie M. DuBray	107
Brilliant Flames Mariah Gladstone	113
Regeneration on the Range Paige Stanley	119
One Prairie Strip at a Time Lisa Schulte Moore	125
The Perennial Imagination Jesse Nathan	133
From Corn Belt to Pasture Laura Paine	135
Root Foods Kelly Kindscher	143
The Beauty of Polycultures Valentín Picasso	150
III. GRAIN	
Grain Liz Carlisle and Aubrey Streit Krug	157
Australian Native Grains Awakening Jacob Birch	161
Where the Story Starts Muhammet Şakiroğlu	169
Toward Perennial Sorghum Pheonah Nabukalu	175
Joyful, Needed Work Lee DeHaan	181
I See More Life than Ever Before Wendy Johnson	187
Going to Market Colin Cureton	193
Field Notes from a Perennial Kitchen Beth Dooley	201

Hand Threshing Aubrey Streit Krug	205
Generation by Generation David Van Tassel	207
After the Flood Piyush Labhsetwar	213
Shallow Roots Run Deep Tim Crews	217
Rooting for Ourselves Laura van der Pol	225
Acknowledgments	231
Notes	235
Contributors	257
Index	269

Introduction

There's something particularly lonely about attending to the minutiae of daily life while the planet is burning. You take your child to day care. The ocean warms to unprecedented temperatures. You drive to work. Your city sets another heat record. It feels like everything that really matters is somehow out of reach.

But all around us are fellow beings whose very metabolic nature proclaims their ongoing allegiance to the living world. Mussels filtering water. Bees pollinating wildflowers. Sheltering trees bearing fruit. This begs the question, Why can't we humans sustain ourselves in ways that sustain others too?

Right now, our food systems often function like the agricultural equivalent of fast fashion. Plants are only in the ground for this season. A handful of these annuals—corn, soy, wheat, and the like—dominate the landscape. Commodity crops are shipped out in tremendous volume, harvested and processed by people whose work puts their health and livelihood at risk. These crops are hurriedly assembled into cheap, low-quality products. Fossil fuels are squandered at every stage

of the process, and it all ends in a stupefying amount of waste. Indeed, our food systems are currently responsible for a third of global greenhouse gas emissions, from the carbon dioxide lost when clearing land to the methane emitted from all that wasted food in the landfill.

As environmental scholars and educators, we found ourselves wondering, How do we build a food system that is made to last?

In both of our places, we started to learn about the diversity of food systems that flourished a few hundred years ago. In coastal California, where Liz lives and works, acorns featured as a staple food, alongside holly leaf cherries and elderberries. Chumash and other Indigenous peoples tended these prolific food forests with fire and an epic collective pruning effort. In the central Great Plains, where Aubrey lives and works, grasslands have been stewarded by the Kaw, Pawnee, Osage, Omaha, and other Indigenous nations. Prairies fed bison, elk, rabbits, prairie chickens, and the many people who relied on these creatures along with plums, berries, and a bevy of tasty roots.

The key to both of these food systems is that they worked with, rather than against, the creativity of the plants that evolved to live most abundantly across Earth's landscapes: perennials.



Perennials, roughly speaking, are plants that live for more than one year. You're probably familiar with many perennial plants already: Trees and bushes are perennial, as are the long-lived grasses you might see out in the rural parts of the country where we are from. You might have even eaten some perennial foods today: Tree nuts and tree fruits are obvious ones, but grass-finished meat raised on perennial pasture might be a candidate for this designation as well. What these foods all have in common is that they come from farms where plants stay in the ground for multiple seasons. Which means their roots can go to work.

Perennials stay in place for decades—and sometimes centuries—precisely because their roots are so active. Roots seek and exchange; they push and pull, tense and release; they brace, rub, infiltrate; they decay and turn over. Roots go deep, sometimes dozens of meters. Critically, they take sunlight energy harvested by the plants' leaves and deliver it into the ground to provide food for microbes, with which they form a sort of belowground superorganism. Microbes gather nutrients and water needed by the plants, while plants feed microbes the sugars they need to survive. Year after year, perennial plants allocate a quarter to a third of their solar harvest to their microbial mutualists, pulling carbon down out of the atmosphere and building up the terrestrial life support system commonly known as soil.

This rooting movement of matter and energy happens in the dark, mostly out of sight. But it is integral to how sunlight powers precious cycles of life.



You may know this story: An empathic teenage girl convenes a community and navigates a path forward amid water scarcity, political crisis, economic collapse, and acute climate change. It's the story of Lauren Olamina, the main character of Octavia Butler's prescient and enduring science fiction classic *The Parable of the Sower*, set in California in the 2020s.

In her journey, Lauren relies on seeds. Seeds as inspiration for her worldview and seeds as literal food stocked in her survival pack. Eventually Lauren and her community make it to a place they name Acorn, where they bury their dead and plant oak trees. In the face of apocalyptic devastation, Lauren's dreams of future life are made possible by her alliance with these deep-rooted old friends who have been with humanity through thick and thin.

Now more than ever, humans need both perennial foods and the living roots required to grow them. At this advanced hour, perennial plants can't avert the climate crisis. People must slow and stop the burning of fossil fuels. But where and how we grow perennial foods will help shape what human futures are possible. Perennials can help us significantly mitigate emissions, so the climate crisis doesn't get worse. They can provision a growing buffet of foods and medicines that help us navigate hard realities and limits, and they can supply meaningful relationships that inspire us to create better place-based communities. These hardy survivors can help us weather the heat, drought, and storms that are coming our way with increasing frequency.

Perennials play the long game, spreading the wealth both above and below ground to find a durable balance. This is how they deal with carbon. Whereas annual plants like wheat and corn allocate only 15 to 30 percent of their total carbon stores underground, native perennial grasses and forbs allocate 50 to 67 percent of fixed carbon in root or rootlike tissues below the soil surface. Conversion of these perennial landscapes to annual cropland has resulted in 35 petagrams of carbon escaping to the atmosphere, roughly equivalent to three to four years' worth of worldwide emissions from fossil fuels and cement. Just imagine if we began to bring these perennial ecosystems back.

Likewise, nitrogen has historically been carefully stewarded by perennial plants. This element gets less press than carbon, since carbon dioxide is so much more prevalent in the atmosphere than its nitrogenous greenhouse gas cousin. But nitrous oxide has 300 times the warming power of its more famous fellow greenhouse gas, so it's worth paying attention to. Some 55 percent of it comes from agriculture, due to overuse of synthetic fertilizer and fields being left bare for much of the year. All this excess nitrogen from crop fields also escapes into the watershed, which is why agriculture is this country's largest source of

water pollution and there are over four hundred marine dead zones around the globe.

The good news is, perennial plants can help us clean up this mess. By restoring them where they belong, we can replace at least some of the carbon lost from these landscapes, drawing it back down from the atmosphere. Perennial plants don't need to be replanted each year, so they can alleviate the need for tillage and instead hold soil and its carbon in place. They can be grown with little or no fossil fuel-based fertilizer. And they can scavenge much of the nitrogen currently running off farm fields, intercepting potential pollution and recycling it into food for microbes—and eventually people too.



But in order to revive these critical climate allies when humanity needs them most, we will need to reciprocate, to come to the aid of perennial plants as they have come to ours. We will need to restore rightful land access for Indigenous communities who have long stewarded plant relatives. Those of us who have been disconnected from land for generations must take care not to appropriate the traditions of Indigenous communities but instead rekindle our own friendships with photosynthesizers. It will take all of us working in concert, which is where you come in. It might start with a new recipe or a new sapling tucked into your backyard. You and your neighbors might plant a food forest or volunteer to help a local farmer establish a hedgerow. One way or another, we can all nurture the living roots of primarily perennial food systems.

Humans stand on top of the ground; unlike roots, we can bask in the sun. But our lives are interdependent with our fellow beings, with perennial plants whose trunks and stems can tower over us, whose rooting depths can outreach us. And like roots we live in the dark when

it comes to knowing much about the future. What we do know is our powerful propensity for seeking, making, learning. Our technology and labor—not to mention other animals and tools—are woven into the fate of our homeland on Earth. What we do now matters.

The tricky beauty of our reality is that as a species we know how to do many things. Many of us live in societies built through the burning of fossil fuels, but selecting seeds, pruning trees, and singing songs are human enterprises as well. People are constantly solving problems and getting ourselves into trouble. We know how to fertilize wheat and breed perennial grains, scroll social media and pluck serviceberries, drive cars and run long distances. We wage wars, but we can also extend olive branches. Perhaps we must now discern which of these activities can endure, tell the truth about which of these we want to persist and grow. Are we willing to try to live? What gifts do we each have to bring for the benefit of all?



From the earliest days of civilization, many communities developed intimate knowledge about the perennial plants they harvested to feed their families, fuel their hearths, and weave the tools of everyday living. Eighty thousand years ago, people in what is now southern China were likely eating carbohydrate-rich nuts as part of a varied diet. Sixty-five thousand years ago, people in what is now Australia were grinding the grainy seeds of native perennial grasses. These plants helped people develop ways of life that fit their places, rich with stories and skills passed down to children and grandchildren.

Perennial foods have been the cornerstones of cuisines and cultures. Remember acorns, aptly highlighted in *Parable of the Sower* as a staple food for many peoples around the world. Or the nutrient-dense quartet of olives, dates, chestnuts, and carob, which have nourished people of the Mediterranean basin for millennia. Walnuts and pistachios

in Kyrgyzstan. Oil palms in the tropics. Camas bulbs in western North America. Protein-rich and drought-tolerant mesquite in the Mesoamerican desert.

And yet, today, some 60 to 80 percent of global cropland is dedicated to annuals, just four of which (corn, wheat, rice, and soybeans) account for 75 percent of the calories consumed by people.

There are deep-seated reasons for this dramatic shift toward a handful of annual foods, entrenched political and economic forces that have pushed agriculture toward short-term profits rather than long-term human and environmental health. Building robust perennial food systems means challenging these forces and the corporations and decades of received wisdom arrayed behind them. We'll also need to repair the damage already wrought by extractive annual agriculture, regenerating soils and social bonds so we can sustain people and the land. And we'll need to build systems to ensure that the ecological and economic benefits of more perennial landscapes will be fairly distributed. A bold movement into a more just, perennial food future is no small task. It will require badgering our elected officials, having courageous conversations with our neighbors, and embracing new flavors and rural aesthetics.

And yet we think people are up for it. Already, in fact, many thousands of people are standing up for perennials and the lifeways that can go with them. In this book, you'll hear from Indigenous scientists and community leaders who are working to restore buffalo prairies and traditions of berry gathering. You'll also hear from urban visionaries planting food forests. Farmers planting fruit and nut trees between their crops and hedgerows at the edges of their fields. Ranchers learning to graze their livestock in patterns that mimic the behavior of native herbivores, so as to steward healthier grasslands. And you'll hear from scientists and farmers who are developing and stewarding perennial grains, from sorghum to silphium.

These efforts are wildly diverse, much like a healthy forest or prairie. People don't all have the same life histories and strategies. And yet we do share a common home planet, and we will have to work with perennial plants to care for it.

We, the contributors to this book, are willing to devote our lives to this work, to realizing new and renewed access to perennial foods and landscapes. We share a vision for a food system that can sustain us and our descendants and their descendants and their descendants, for generations into the future. A food system that doesn't leave anyone out, that relieves the climate chaos and the burden of anyone with polluted water or exploitive working conditions. A food system in which both plants and people nurture the sustaining collective power of living roots.

Some of the stillness I have found is bound to last
Some of the restlessness will live on
Some of the pain I've always known is hard to pass
But a mutual blessing takes the game on

Summer seed become my perennial bloom
Summer's healing coming soon

—Lukas Nelson & Promise of the Real
(lyrics from “Perennial Bloom (Back to You)”)

Wildness. . . . It is perennially within us, dormant as a
hard-shelled seed, awaiting the fire or flood that awakes
it again.

—Gary Snyder
(from *The Practice of the Wild: Essays*)

the profound change
has come upon them: rooted, they
grip down and begin to awaken

—William Carlos Williams
(from “Spring and All”)

It is only when we are fully rooted that we are really able
to move.

—Madeleine L'Engle
(from *A Wind in the Door*)



Index

- acorns, 55, 115
- African rice (*Oryza longistaminata*), 159
- Afro-Indigenous farming techniques, 23
- After the Flood (*Labhsetwar*), 213–216
- agave cultivation, 34–35
- agricultural sustainability, 86
- agriculture
 - agricultural lands owned by Black people, 23
 - agricultural systems, 152–153, 155
 - animal agriculture, 123–124
 - diversification of agricultural lands, 80
 - regenerative, 80, 81, 83
 - in the US, as annual rather than perennial, 135
- agroecosystems, 137, 139
- agroforestry
 - ancient desert food systems and, 37
 - the climate case for, 12–14
 - coffee cultivation and, 65
 - persimmon as a crop for, 72, 78
 - persimmons and, 77
 - satisfaction in, 90
 - Soul Fire Farm’s emphasis on, 22
 - Western culture frame, 89–90
- alley cropping, 12, 48, 90
- almond tree (*Prunus dulcis*), 54
- American hazelnut, 88–89, 91
- American Hazelnut Company, 203
- American persimmon (*Diospyros virginiana*), 72–75, 76, 78
- ammonite, 102
- animal agriculture, 123–124
- annual cropland, 140
- annual cropping systems, 34, 141
- annual plants
 - allocation of carbon stores
 - underground by, 4
 - corn, 34, 95, 127, 135–138, 157
 - percent of global cropland dedicated to, 7
 - percentage of plant species which are, 218
 - relationship of annuals to human population, 219
 - sorghum (*Sorghum bicolor*), 177, 178
 - soybeans, 7, 127, 139, 177
 - that dominate the landscape, 1

- annual sorghum (*Sorghum bicolor*), 177
antelope, 116
anthropogenic fires, 116
ants, 31–33, 66, 67, 68
Apis americana (hogniss), 147
apples and apple orchards, 22, 23
Arbuckle, J., 130
archaeological sites, ancient, 34
Arctostaphylos uva-ursi (bearberry), 58–62
armadillos, 150
Asian rice (*Oryza sativa*), 159
Atta mexicana (Mexican leafcutter ants), 31–33
Australia, 161–168
Australian Agricultural Company (AACo), 165–166
Australian Native Grains Awakening (*Birch*), 161–168
Azteca sericeasur ant, 67
- bald eagles, 129
barley, 54, 152, 158, 162, 222
bats, 67
Bear Berry Tea (Makwamiskominaaboo), 61–62
bearberry (*Arctostaphylos uva-ursi*), 58–62
beargrass, 117
bears, 144
The Beauty of Polycultures (*Picasso*), 150–155
bee balm, 19
beetles, 66, 67, 68, 128
bighorn sheep, 116
biodiversity
 in Anatolia, 169
 contribution of native grains to, 167
 how cultural fire fosters, 153
 importance of adapting practices of, 84
 loss of land supporting, 163
 putting biodiversity into practice, 80
 western blue elderberry (*Sambucus cerulea*) as supporter of, 81
- biomes
 forest, 114–115
 grassland, 115–117, 150–151
biomimicry, 48, 51
birds, 67
bird’s-foot trefoil, 172
bison, American, 96, 116, 121, 145
 . *see also* buffalo and buffalo restoration
Black people, 20–22, 23, 40
black walnuts, 14
Blackmon, Bill, 147
bobolinks, 155
Bohrer, Vorsila, 34
Bonefacio, Alejandro, 221–222
boundaries, 89–90
Braiding Sweetgrass (Kimmerer), 94
Brazil, 65, 189
Brilliant Flames (*Gladstone*), 113–118
Buechner, Frederick, 182
buffalo and buffalo restoration, 107–112
 . *see also* bison, American
“buffalo stones,” 102
buffelgrass, 163–164
Butz, Earl, 188
- The Cactus Forest (*Nabhan*), 31–37
cactus/cacti, 31–37
California buttercup, 94
camas bulbs, 148
capybara, 150
carbon, 2, 3, 4
carbon dioxide, 2, 19
 . *see also* greenhouse gases
carbon sequestration, 12, 43, 96, 120, 121–122
carbon sink, 15, 140
Caribbean, the, 65
carob tree (*Ceratonia siliqua*), 54
caterpillars, 66–67
cattle, domestic, 121–122, 137, 138, 189
Central America, 65–66
cereals, 157–158

- ceyaka (wild field mint), 109
- Ceylon, 64–65
- charcoal deposits and charcoal data, 115, 116
- chestnut trees, 115
- chickens, 20, 25–30
- Chinese chestnuts, 14
- Claypool, Jim, 76, 77
- Clement VIII (pope), 64
- climate change
 - carbon footprint of livestock production, 153
 - converting grasslands to agriculture as cause of, 154
 - current state of annual cropland as contributor to, 140
 - deforestation and, 12
 - historic legislation addressing, in 2022, 14
 - how native grasslands help mitigate, 150
 - massive flooding events as indicative of, 189, 215
 - planting of sorghum as a way to mitigate, 179
 - practice of *fanya-juu* in mitigating, 19
 - predictions about, and effect on crops and food yields, 36
- climax ecosystems, 138
- clovers, 172
- cocoa beans, 28
- coffee
 - in Ceylon, 64–65
 - in Chiapas, Mexico, 66, 68
 - coffee farms, 65–68
 - development of coffee leaf rust, 65, 66
 - in Ethiopia, 63, 69
 - farms, ground-foraging ants in, 66
 - farms, role of shade trees on, 65–67
 - harvest, 27
 - pest control on coffee farms, 67
 - plantations, 63–64, 65
 - production in South Asia, demise of, 65
 - seeds, dispersion of, 63
 - spread of, across the world, 63–64
 - stimulating properties of, 63
 - technification, 66
- colonial plantations, 64
- colonial violence, 108, 110, 111
- comfrey, 19
- commodity crops, 1–2
- Compton, Don, 76, 77
- corn, 34, 95, 127, 135–138, 157
- Corn Belt, 135–142
- From Corn Belt to Pasture (*Paine*), 135–142
- creosote bush, 33
- crop domestication, 159
- cropping systems, 12–13, 34, 141, 158–159, 189–190
- cultural burning. *see* cultural fires
- cultural fires, 23, 50, 94, 103, 113–118
- daffodil, 19
- dallisgrass or honey grass (*Paspalum dilatatum*), 151
- Davison, Bill, 77
- debris flows, 82
- debt bondage, 64, 65
- deforestation, 11, 12
- DeHaan, Lee, 210–211
- Diospyros mespiliformis* (jackalberry), 74
- Diospyros virginiana* (American persimmon), 72–75, 76, 78
- diploid, 178
- disturbance, 52
- disturbance regimes, 50, 52
- DNA, plant, 210–211
- Dutch East India Company, 64
- Egypt, 64
- elderberries, 203–204
- Elderberry Project, 83
- Elderberry Season (*Smith*), 79–84
- elk, 116
- energy transformation, 29
- enslaved, the, 72, 73, 74

- erosion, 14, 17–19
Ethiopia, 63, 69
ethnobotanists, 34
Eurasian intermediate wheatgrass
(*Thinopyrum intermedium*), 159,
228
- fanya-juu* (“throw it upwards”), 19, 23
Farm Bill, the, 191
Farming-in-Relationship-with-Earth
(FIRE) immersion, 22
feedlots, 154
Fertile Crescent, 53
fertilizers, 140
field mint, wild, 109
Field Notes from a Perennial Kitchen
(*Dooley*), 201–204
fig tree (*Ficus carica*), 54
fire. *see* anthropogenic fires; cultural fires;
fire-pruning; prairie fires; prescribed
burning; wildfires
fire-pruning, 117
fireweed, 115
Fish, Paul, 34
Fish, Suzanne, 34
flies, 68
flooding, 14
floods, 14, 52, 164, 214–215, 218
food chain, 3
food forest, 41, 44
A Food Forest for Southeast Atlanta
(*Bovens and Griffin*), 39–44
food insecurity, 40–41
food justice, 194
food systems, 2, 7, 8, 22, 37, 177–178
forced labor, 64
forest biomes, 114–115
forest farming, 12
forests, 11–15
Forever Green Initiative, 194–195, 196,
197
fossil fuels, 158, 171
fossils, 102
- From the Fringe (*Keeley*), 47–52
fruit, 55
Fruit Finding (*Greenman and Davison*),
71–78
- gardening, 42
garlic, 19
Generation by Generation (*Van Tassel*),
207–211
Gilmore, Melvin, 144
goats, 20
Going to Market (*Cureton*), 193–200
goosefoot, 115
grains
crop domestication and, 159
crossing existing annual grains with
perennial, 159
developing crops from perennial rather
than annual, 158–159
maize, 34–35, 152, 157. *see also* corn
native, of Australia, 167
oats, 158, 169
requirements for cultivating annual
grains, 158
. *see also* wheat
grasses
African rice (*Oryza longistaminata*), 159
Asian rice (*Oryza sativa*), 159
barley, 54, 152, 158, 162, 222
buffelgrass, 163–164
Eurasian intermediate wheatgrass
(*Thinopyrum intermedium*), 159
Ganalay, 162, 164
grass family (Poaceae), 93
grass farmers, 95
Guli, 162
Johnsongrass (*Sorghum halepense*),
177, 178
native perennial grasses of Australia,
164
perennial, 95–96, 121, 164
successful cross between annual and
perennial rice, 221

- grasslands
 converted to cropland, 93
 foods from, 94
 grassland buffers, 95
 grassland ecosystems, 117, 138, 139
 grassland reconstruction, 131
 as percentage of earth's surface, 93
 Rio de la Plata grasslands, 151
 in the United States, historically, 93–94
 of Uruguay, 150–151
 of the western United States, 115–117
 work of cattle in restoring, 137, 138
grazing management, 122, 138, 153
grazing-based system, 139
Greenberg, Russ, 67
greenhouse gas emissions, 154
greenhouse gases, 13, 120, 154
 . *see also* carbon dioxide; methane; nitrous oxide
Griffin, Rosemary, 41–44
Guatemala, 27, 28

H2A guest worker program, 23
Haiti, 17
Hand Threshing (*Streit Krug*), 205
Hardeman, Doug, 41–44
Hazel-Bush and Willow (*Iutzi*), 85–91
hazelnut plants, beaked, 115
hazelnut trees and hazelnuts, 25–26, 28, 203
hedgerows, 12, 14, 81
herbivores, 7, 95, 114, 116, 120, 147
herbs, 54–55
heritage crops, 162
hickory trees, 115
Hodgson, Wendy, 34
Hoiem, Eric, 129
hopniss (*Apios americana*), 147
Hu, Fengyi, 221
huckleberry, 115
human systems of domination, 160

I See More Life than Ever Before (*Johnson*), 187–192
indentured servitude, 64
India, 64
Indigenous microorganisms, 22
Indigenous peoples
 the Anishinaabeg, 60
 of Australia, and colonization, 164–166
 avoiding appropriating the traditions of, 5
 banning of Indigenous fire, 117
 the Blackfeet, 98–104, 113–114
 and the coffee industry, 68
 and communities, restoring land access, 23
 desert dwellers, diet of, 33
 displacement and attempted erasure of, 50
 dispossession of, effects on landscape of United States, 94
 fair trade coffee market, 68–69
 the Gamilaraay of Australia, 162, 166–167
 harvesting of grassland plants, 94
 harvesting of tipsin by, 145–146
 hopniss as food of, 147
 importance of the Deities to, 101–102
 improving digestibility of root foods, 148
 Karuk people, 117
 Lakota, 108, 110, 112
 land care by, 50
 land stewardship of, 114, 118, 121
 in Mexico, diet of, 35
 the Oromo of Ethiopia, 63–64
 plants from Native agriculture, 115
 regenerative ways of working, 28
 restoring prairie foods, 96
 role of the Holy Woman, 103
 solidarity with the people of Palestine, 111

- studying agroecology at Soul Fire Farm, 20–22
as survivors, 23
understanding of ecological processes by, 102–103
use of fire, historically, 23, 50, 94, 103, 113–118
the Zapatistas, 68–69
industrial food systems, 157
insects, 67, 81, 102–103, 129
insects, pollinator, 129
intercropping, 13, 48
Inter-Tribal Bison Cooperative (ITBC), 109
irrigation systems, 34
- jackalberry (*Diospyros mespiliformis*), 74
Jackson, Wes, 152, 219
jadén lakou, 20–21
Java, 64
Johnsongrass (*Sorghum halepense*), 177, 178
Joyful, Needed Work (*DeHaan*), 181–186
- Kernza, 187–191, 195–200, 202–203, 213–216, 229
keystone species, 50, 51, 67, 164
Krutch, Joseph Wood, 37
- The Land Institute, 152
Landscapes of Abundance (*LaPier*), 97–104
Laratte, Hyacinth, 17–18
LaShae, Tiffany, 23–24
Latine peoples, 23
legumes
alfalfa, 172
bird's-foot trefoil, 172
clovers, 172
perennial, 170–171
sainfoin, 170, 172–174
L'Engle, Madeleine, 9
lentils, 158, 172
- Leucoagaricus gongylophorus* (*L. gongylophorus*), 32–33, 34
The Little Prince (Saint-Exupéry), 150
Lukas Nelson & Promise of the Real, 9
- mahogany, 17
maize, 34–35, 152, 157
Makwa-miskomin (*Arctostaphylos uva-ursi*). *see* bearberry (*Arctostaphylos uva-ursi*)
Makwa-Miskomin: Bear's Red Berry (*Geniusz*), 57–62
Makwa-miskominaaboo (Bear Berry Tea), 61–62
Mal'oul Celebrates Its Destruction (film), 54
managed beef production, 154
managed grazing, 122, 138, 153
medicinal plants, 57–62, 101
Mediterranean
climate, 53
Fertile Crescent, 53
Mesoamerica, 65
mesquite, 35–36, 37
methane, 2, 154
. *see also* greenhouse gases
Mexican leafcutter ants (*Atta mexicana*), 31–33
Mexico, 66, 68
migratory birds, 67
Mississippi River watershed, 141
Mitchell Persimmon Festival, 75–76
monocultures, 48, 171
Morgan, Ruby, 43
Morgan, Willie, 43
Morse, Shami Lucena, 129
mudslides, 82
mulberry tree (*Morus*), 43, 54, 71
mule deer, 116
- native grains, Australian, 161–167
nature, Western paradigms about, 137
Neighbors (*Kaminski*), 45–46
New Roots for Agriculture (Jackson), 219

- nitrogen, 4, 95, 116, 170, 220
nitrous oxide, 4, 12–13
 . *see also* greenhouse gases
Nookomis Giizhik (*Thuja occidentalis*).
 see white cedar (*Thuja occidentalis*)
North American Great Plains, 93
no-tillage systems, 140, 141, 154
nutrient runoff, 95
- oak savanna, 50, 193
oak trees, 115
oats, 158, 169
The Odyssey of Coffee (*Perfecto*), 63–69
oil crops, 158
oilseeds, 158
olive groves, 162
olive trees, 55
One Prairie Strip at a Time (*Moore*),
 125–131
One Straw Revolution (Fukuoka), 48
Organic Valley, 48–49
Oryza longistaminata (African rice), 159
Oryza sativa (Asian rice), 159
- Palestine, 53–55, 56, 111
The Parable of the Sower (Butler), 3, 6
Paspalum dilatatum (dallisgrass or honey
 grass), 151
pecans, 14
People of Color, 20–22
perennial agriculture, 36, 52, 88, 135,
 160, 190–192
perennial grain crops, 181, 185–186
 . *see also* Kernza
The Perennial Imagination (*Nathan*),
 133–134
perennial plants
 ancient knowledge of, 6
 community of, 88
 harvested by Mexican leafcutter ants
 (*Atta mexicana*), 32
 legumes, 170–171, 172
 of Mexico, 35–36
 overview of, 2–4, 5
 percentage of plant species which are,
 218
 serviceberries, 100–101
 soils beneath perennial vegetation,
 228
 sorghum, 176–179
 woody, 15, 32, 43, 89, 91
perennial strips, 95
perennial system, 140
permaculture, 27, 80, 162
Persia, 64
persimmon pudding, 75–76
persimmons, harvesting, 77
pesticides, 140
Peters, Walter, 66–67
photosynthesis, 140, 208
pit baking, 148
plants as food, 96, 100–101, 143–149
pollinators, 35, 43
pollution. *see* water pollution
polycultures, 20–22, 48, 49, 51,
 152–153, 155
Pope Clement VIII, 64
prairie, tallgrass, 137, 138
prairie acreage, Illinois, 137
prairie ecosystems, 109
prairie fires, 116, 117
prairie plants
 hopniss (*Apios americana*), 147
 prairie turnip (*Pediomelum*
 esculentum), 94, 109, 116
 silphium (*Silphium integrifolium*),
 208, 209, 210–211
 tipsin or tinsila (*Pediomelum*
 esculentum), 94, 109, 144, 145–147
prairie restoration, 86, 148
prairie root foods, 143–149
Prairie Sonnet (*Westerman*), 105
prairie strips
 encourage rapid return of abundant
 life, 129
 improve ecosystem services on row
 crop agricultural landscapes, 129
 improve water infiltration, 128

- increase in farmers willing to implement, 130–131
- Midwestern farmers and, 95
- reduce runoff, 128
- Science-Based Trials of Rowcrops Integrated with Prairie Strips (STRIPS) project, 126
- soil particles and, 128
- STRIPS team, 127, 128, 130, 131
- “prairie turnip paradox,” 94
- prairie turnip (*Pediomelum esculentum*), 94, 109, 116
- prairies, colonization of, 217
- prairies, railroad, 136–137
- prescribed burning, 117
 - . *see also* cultural fires; prairie fires
- In the Presence of an Olive Tree (*Tesdell*), 53–56
- prickly pear cacti (*Opuntia ficus-indica*), 37, 54
- Project Drawdown, 13
- pulses, 158, 172, 173, 174
- pyrophytic plant species, 115

- quinoa, 221–222

- racism, 22, 40–41
- rain, 34, 54, 99–100
- rainforest, 189
- rangelands, 119–124
- raspberry, native, 114–115
- reforestation, 18
- Regeneration on the Range (*Stanley*), 119–124
- regenerative agriculture, 28–30, 80, 81, 83
- regenerative grazing, 120, 122
- regenerative ranches, 122–123
- regenerative ranching community, 95
- regime, 50
- Restoration Agriculture* (Shepard), 48
- restoration ecology, 49
- rice, 152, 157, 159, 189, 221
- ring-necked pheasants, 129

- Root Foods (*Kindscher*), 143–149
- Rooting for Ourselves (*van der Pol*), 225–230
- roots, 2–3, 55, 229
- ruminants, 20, 119, 123, 137, 188
- rye, 158, 162

- sainfoin, 170, 172–174
- Sambucus cerulea* (western blue elderberry), 80–81, 82–83, 84
- Sardinia, 162–163, 166
- Savanna Institute, 49, 51, 77
- Science-Based Trials of Rowcrops Integrated with Prairie Strips (STRIPS) project, 126
- sea oats (*Uniola paniculata*), 175–176
- seeds, 55
- serviceberries, 100–101, 115
- Shallow Roots Run Deep (*Crews*), 217–223
- sheep, 20, 165
- Shields, David, 71
- Silent Spring* (Carson), 137
- silphium (*Silphium integrifolium*), 208, 209, 210–211
- silvopasture, 12, 13, 20–21, 90
- singing, 101–102
- skunks, 150
- slavery, 17, 22, 23, 65
 - . *see also* debt bondage; enslaved, the; forced labor; indentured servitude
- Sloan, Dick, 129
- Smithsonian Migratory Bird Center, 67
- Snyder, Gary, 9
- soaproot, 94
- soil carbon, 121, 141, 154, 229, 230
- soil health, 12, 18, 80–81, 110, 127, 220
- soil sampling, 225–227
- Sonoran Desert, 35, 36
- sorghum, 158
- Sorghum bicolor* (annual sorghum), 177
- Sorghum halepense* (Johnsongrass), 177, 178
- Soul Fire Farm, 18, 20–21, 22

- South America, 65
soybeans, 7, 127, 139
Species in the Jaden Lakou Agroforest
and Silvopasture of Soul Fire Farm,
21
Sripichitt, Prapa, 221
sugar plantations, 17
sunflower, 115
sustainable agriculture, 88, 152, 210
sustainable food systems, 87, 176
symbiotic relationships, 32–33
Syria, 64
- Tao Dayun, 221
tetraploid, 178–179
They Could Hear the Buffalo (*DuBray*),
107–112
thimbleberries, 115
Thinopyrum intermedium (Eurasian
intermediate wheatgrass), 159, 228
Thomas Fire, the, 82
Throw It Upwards (*Penniman*), 17–24
Thuja occidentalis (white cedar), 58, 60
tinsila, 109
. see also prairie turnip (*Pedimelum
esculentum*)
tipsin, 144, 145–147
. see also prairie turnip (*Pedimelum
esculentum*)
tobacco, 101–102
Toward Perennial Sorghum (*Nabukalu*),
175–179
tree crops, 12, 14, 76, 169
Tree-Range Chicken (*Haslett-
Marroquin*), 25–30
trees
Aleppo pine trees (*Pinus halepensis*), 54
almond tree (*Prunus dulcis*), 54
American persimmon (*Diospyros
virginiana*), 72–75, 76, 78
carob tree (*Ceratonia siliqua*), 54
eucalyptus, 151
fig tree (*Ficus carica*), 54
found in Palestine, 54
jackalberry (*Diospyros mespiliformis*),
74
mulberry tree (*Morus*), 43, 54, 71
nut trees, 115
oak (*Quercus*), 115, 162
olive (*Olea europea*), 54
shade trees, 65–67
valuable attributes of, 13
yearning for, as part of freedom, 22
. see also oak savanna
Tubman, Harriet, 22
Turkey, 64, 170, 171
- Uganda, 176, 177
Underground Railroad, 22, 74, 216
Uniola paniculata (sea oats), 175–176
United Nations Food and Agriculture
Organization (FAO), 36, 153
Unsettling of America (Berry), 47
Urban Food Forest, 41
urban heat islands, 43
Uruguay
grasslands of, 150–151
no-tillage systems in, 154
US Agency for International
Development, 65–66
US Department of Agriculture, 14, 23,
140
US Department of Agriculture Forest
Service, 41
vesper sparrow nest, 125–126
vetiver, 18
- water pollution, 4–5, 152, 185
watermills, 169–170, 173
watershed, 4–5, 15, 34, 95, 141
Weeks Act, 114
western blue elderberry (*Sambucus
cerulea*), 80–81, 82–83, 84
wheat
in Anatolia, 169
as an annual, 202
domestication of, 152

- as heritage crop, 162
- percent of global cropland dedicated to annuals, including wheat, 7
- percent of total underground carbon stores from, 4
- role of, in the human diet, 157
- Where the Story Starts (*Şakiroğlu*), 169–174
- White Buffalo Land Trust, 80, 82, 83
- white cedar (*Thuja occidentalis*), 58, 60
- white-tailed deer, 116, 129
- wild carrot, 115
- wild Greek sage (*Salvia fruticosa*), 54
- wildfires, 116, 117
- wildflowers, 127
- Williams, William Carlos, 9
- willow, 88–89
- Wisconsin Integrated Cropping Systems Trial, 141
- “worm stones,” 102
- yampah (wild carrot), 115
- Yemen, 64
- za’atar (*Origanum syriacum*), 54–55
- za’atar farisi (*Thymbra capitata*), 55
- za’atar rumi (*Satureja thymbra*), 55
- za’atar sabbal (*Thymbra spicata*), 55