Healing Grounds

Climate, Justice, and the Deep Roots of Regenerative Farming

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CHAPTER 4

Putting Down Roots

When Aidee Guzman was still scouting for collaborators, she got a tip about a monoculture squash farm just outside of Fresno. Excited, Guzman and her research assistant drove off toward the intersection they'd been directed to, hopeful the farmer might give them permission to take some soil samples. The mood in the car was light and jocular, but in the back of her mind, Guzman was doing math. Silently tabulating the farms she'd recruited so far, she couldn't help but worry about how many more she still needed.

In order to make statistically sound comparisons, Guzman had a daunting task. She had to find at least thirty small farms that grew one of her "focal" crops—squash or eggplant. Half of these farms needed to be monocultures, half needed to be polycultures, and in all other ways, the farms had to be reasonably comparable—so that confounding variables wouldn't invalidate her findings. For months, Guzman had been poring over satellite maps and driving around Fresno, confident these farms existed even though some of her senior colleagues were concerned that she might be attempting the impossible. After all, no one had ever successfully completed a study like this before.

When Guzman and her research assistant arrived at the corner they'd been directed to, they pulled over and scanned the landscape. Squash was nowhere in sight. Instead, they found themselves at the back of what appeared to be the most diverse farm they'd seen yet: rows upon rows of nearly every crop Guzman knew, as well as several she didn't recognize. From a distance, Guzman began enumerating the familiar plants: lettuce rows here, a small peach orchard there. Curious, she and her research assistant got out of the car and walked closer.

Still half hoping to eventually find squash, Guzman's eyes were drawn to a row of trellises. Hanging from the nearest trellis was a spiky, dark green gourd, sort of like a cross between a zucchini and a porcupine. This striking fruit was in the squash family, all right, but it was nothing like the plants Guzman's family grew in their gardens. Guzman scanned her memory for the name of the plant, knowing she'd seen it before. Just as she remembered—bitter melon!—a sprightly Asian woman with neat bangs popped out from behind a row of plants. "Hello," the woman said, "can I help you?"

More than a little apologetic, Guzman and her research assistant explained that they were doing a study on soil health and that they'd been told there was a squash farm in the area. To their relief, the woman smiled. "Ah yes," she said, "two farms over that way."

As she absorbed the directions, Guzman was struck by the commanding presence of this slight farmer, who was no taller than she and clearly many decades older. As the daughter of two farmworkers, Guzman had seen women on Central Valley farms all her life, picking crops and pulling weeds. This woman had clearly done both of those things for years, as evidenced by the calluses on her hands and the dirt under her fingernails. But something about the way she held herself, chatting comfortably in her second language, suggested that she wasn't working on someone else's farm. This place was hers.

Guzman was already halfway to the squash farm when the obvious dawned on her. "Sorry to bother you again," she said when she eventually circled back to the woman who'd given her directions, "but would you be willing to participate in our study?" The woman happily agreed, introducing herself as Keu ("Koo") Yang Moua. The farm that Guzman serendipitously stumbled upon would turn out to have the highest diversity of beneficial fungi she'd seen yet.

From Laos to Fresno

Well before the US officially entered the war in Vietnam in the 1960s, the Central Intelligence Agency began waging an all-out battle to defeat communism in Southeast Asia. As part of the CIA's secret mission, members of an ethnic minority group in Laos were recruited to fight alongside US military and special forces. These people, the Hmong, lived in remote mountain areas and practiced subsistence agriculture. They had no intention of leaving their villages. But when the US lost the war, the Hmong found themselves in mortal danger. Deemed political refugees by the United Nations, they began resettling in the United States, arriving in waves over the course of more than twenty years. Large numbers of Hmong settled in Wisconsin and Minnesota, assisted by resettlement agencies and the US government. Thousands more came to California, many of whom eventually landed in Fresno.

California's Central Valley—flat, dry, and frequently smoggy—was nothing like the humid tropical mountains the Hmong had farmed for generations. But since farming was what they knew, numerous Hmong families resolved to transplant their agricultural traditions to this strange new place. By 2008, a University of California survey identified 1,500 Southeast Asian farms in Fresno County, nearly half of them less than five acres in size.

The Yang family was among the first waves of Hmong to migrate to Fresno: after a stopover in a Thai refugee camp, they settled in the

valley in 1976. Shortly after the Yangs arrived, daughter Keu married into the Moua family, raising five children. Though her husband had a good job, money was still tight. So in 1990, at the age of thirty-five, Keu Yang Moua leased an acre of land to try her hand at farming. "I tried to learn from the old people," Moua recalls. "The old people that farmed in Laos before they moved to Fresno." Moua leased two acres the following year, then three, then four. Eventually, she had built such a successful farm that her husband decided to quit his job: he could make more money farming with her.

When I asked Moua how many crops she grows, she laughed. "A lot," she said, before launching into a seasonal inventory. "Right now, the summertime, I've got a lot of tomato, bell pepper, eggplant. Wintertime, a lot of bok choy, spinach, lettuce, sweet pea, arugula, radish, red onion, garlic." Moua went on to list her tree crops: Asian pear, peach, orange, persimmon, jujube, and mandelo (or "cocktail grapefruit"). "You know moringa?" she asked. "I grow that too. And gai lan [Chinese broccoli], kohlrabi, brussels sprouts, carrots, daikon, okra, long bean, green bean, bitter melon, cucumber, Japanese cucumber. . . . Too many," Moua said, laughing. "I'm just an old lady."

Having a wide variety of crops is essential, Moua explains, because she sells her produce at a farmers' market. "At the farmers' market, it's a lot of people," she says. "Vietnamese, Chinese, Filipino, Cambodian, Mexican, Russian, Armenian . . . all these people, they have their own veggies." Moua has regular customers who come each week to visit her stall at San Francisco's oldest outdoor produce market, counting on her to be there with their favorite vegetables. So every Saturday she rises in the wee hours to make the two-hundred-mile drive, just as she has for some thirty years.

"I'm old now, but I still like to do my own job," says Moua, now in her sixties. "Lift the box into the truck, go to farmers' market, lift the box out of the truck. . . . Like the people exercise," she says, giggling, "that's what I'm doing."

In the few decades since they began resettling in the United States, Hmong farmers like Moua have become fixtures at farmers' markets, where they make up more than 50 percent of the vendors in some cities. In the upper Midwest, where small family farms gradually gave way to industrial corn and soy over the course of the twentieth century, Hmong farmers brought fresh vegetables back into communities that had all but lost their local food supply. And in California, they carved out a niche providing cultural foods to diverse immigrant communities in cities like Los Angeles, Sacramento, and San Francisco.

"It's not just Southeast Asian consumers," says Ruth Dahlquist-Willard, a University of California farm advisor who works closely with Hmong farmers in Fresno. Hmong farmers do grow an astoundingly diverse menu of crops for their own families and Hmong customers, she says, as well as for shoppers at farmers' markets throughout the state. But urban immigrant communities from across the Asian continent also rely on Hmong farmers, Dahlquist-Willard says, and as a result, these farmers have adopted a wide variety of other Asian crops. "I think some of those communities have gone up to Hmong farmers at farmers' markets and said, hey, do you know what this is and can you grow it?"

But the diversity of crops on Hmong farms isn't simply about meeting customer demand, Dahlquist-Willard adds. "The reason those farms are highly diversified is that they sell to farmers' markets that ask them to be diversified, but that also fits really well with the traditional practices and the crop rotation which that community has historically done back in Laos."

Translating Traditions

Before the "American wars" in Southeast Asia, Hmong farmers practiced what scientists refer to as "rotational swidden agriculture." The steep slopes of their tropical homelands were too fragile to farm continuously,

so families rotated through a series of different plots, letting the land rest between crop cycles and using fire as a tool of regeneration—much like the Indigenous prairie peoples of North America. Because most Hmong lived far away from market centers, specialization and monoculture weren't options. Families needed to grow a complete diet on their rotational plots, from staples like rice and cassava to vegetables, herbs, and even spices. The Hmong managed this diverse array of crops by taking turns working one another's farms. During peak harvest, groups of ten to fifteen people—typically extended family members—would all converge on a single farm. When they finished the harvest, they'd move on to the next place, then the next. As each crop matured, the crew was ready to efficiently gather the perishable produce when it reached its fleeting peak.

When the Hmong attempted to bring their reciprocal labor practices to the United States, however, they ran into a problem. According to California law, all workers on a farm—paid or not—had to be covered by workers' compensation insurance, which could cost a small-scale Hmong farm up to $445 per year. Minimum wage law offered an exception for immediate family, but this was defined as nuclear family members, excluding the extended family members that had been part of Hmong households and labor-sharing norms for generations. When regulators began conducting multiagency labor law sweeps in Fresno County in 2004, Hmong farmers were confused and terrified. Officials descended on their farms without translators, fining them up to $25,000—more than many farmers earned in an entire year—for infractions they often didn't understand. Though the agencies insisted they were not singling out Hmong farms, University of California researchers investigating the incidents concluded otherwise, stating that the number of Southeast Asian farmers targeted by the sweeps "seems disproportionately high."

"[Hmong] farms are typically so small that the vast majority of them are not even captured by the U.S. Census of Agriculture," the researchers wrote. "Yet they are subject to many of the same agricultural regulations as are their corporate counterparts with vastly different historical circumstances." In the wake of the sweeps, at least fifty Hmong farms shut down for fear of being fined, and powerful seeds of mistrust were sown. That wariness had far-reaching consequences, the researchers observed, compounding the existing economic, linguistic, and cultural barriers faced by Southeast Asian refugees. Because they specialized in low-input farming techniques, Hmong farmers were strong candidates for organic certification, which could potentially mean access to California's top-dollar organic market. But certification required paying a fee, filling out paperwork (in English), and adopting new recordkeeping systems (also in English). To have any hope of jumping through all these hoops, Hmong farmers would need help from technical assistance providers—government officials they had come to see as enemies rather than potential sources of support.

To rebuild trust, agencies like the University of California Cooperative Extension service and the Natural Resources Conservation Service (NRCS) turned to Hmong employees. One farm at a time, these Hmong agents tried to help community members translate their traditional practices so that farmers not only complied with regulations but could get paid for their ecological management.

"In the old days, in the old country, they farm for a couple years, then they abandon it for a couple years," says Sam Vang, a Hmong soil conservationist with the Natural Resources Conservation Service in Fresno. "When they abandon it, they allow the vegetation to grow again, which makes sense back in that country—it's on a slope, high rainfall, so most topsoil is going to move down if you farm too long." Many Hmong farmers in the US still retain this concept of fallowing

land to regenerate it, Vang found, so he decided they might as well earn money for their efforts to build the soil. "I say, that's fine if you want to do that," Vang says, "and at NRCS we call that 'conservation cover.'"

Two-Thousand-Year-Old Innovations

As dozens of farmers streamed into Keu Moua's place on an October morning in 2018, Sam Vang looked up at the sky and smiled. After a long summer of triple-digit temperatures and wildfire smoke, the air had cleared and the mercury sat at a benevolent sixty degrees: a great day to showcase Moua's conservation cover and the other soil health practices she and Vang had implemented on her farm over the past five years. "I always use her farm as a model," Vang told me. "You walk into her farm, right away you can tell: this is a farmer who can make a living."

By the time the program began at nine o'clock in the morning, some fifty people had arrived. Hmong women wearing visors chatted with husbands in baseball caps. Recently settled Syrian refugees gathered under a pop-up tent, taking seats next to longtime Punjabi farmers. A Sikh man in a checkered shirt and a turban grabbed a folding chair in the front, eyeing Vang's posters of Moua's cover crop. Supersized images of the thick, intensely green strip of vegetation filled a two-by-three-foot poster board, attracting farmers' attention. Labels in Hmong and English identified the plants Moua had used—vetch, bell beans, peas, and oats—as well as the dates of the photos, which had been taken months earlier in February and March.

Few immigrant farmers in the Central Valley can afford to take land out of production during the summer growing season, Vang explained. So he encourages growers to sneak in the soil-building cover *before* they start planting their crops: in the winter. The timing creates a challenge for Vang's demonstration-style pedagogy, though. "I can show them a beautiful cover crop in February, but are they going to remember it by the time they need to seed their own the next December?" Vang says. The best way to create a hint of February in October, Vang has found, are the enlarged photos, which are palpable enough to give farmers a sense of what they might plant on their own land. "Then we can walk around and show them the results," Vang said.

It's not hard to see the impact of cover crops on Keu Moua's farm, Vang told me, since she has rotated her soil-building crop around different sections of her land each winter. In addition to building up soil fertility, Moua's cover crop has significantly suppressed weeds—so much so that she has added cover crops to the understory of her orchard as well. Moua was eager to demonstrate the difference between two peanut crops, one that followed a cover crop, and one that did not. "The one where you have a cover crop, the plant's more healthy, more green, they have more peanuts in the ground," she said.

Another hot topic at the field day was compost, which has particular significance for Asian produce farmers in the Central Valley. Their soils are too sandy to support ginger, a key crop for many of their customers. But if they amend the land with compost, they can add enough organic matter to shift the soil texture—and ginger can thrive. To make the point, a farmer presenting at the field day held up two pieces of ginger—one grown with compost and one without. The size difference was striking enough, but the farmer went further, taking a bite out of each. It wasn't hard to tell which was tastier.

For many farmers at the field day, seeing cover crops and compost in action was a novel experience. These biological soil-building strategies are rare in the Central Valley, where decades of industrial agriculture have reduced organic matter to extremely low levels. Soils under such intense cultivation have become so degraded, says soil scientist Asmeret Asefew Berhe, that they can cause a chain reaction of water pollution that extends well beyond the farm. Meanwhile, farmers have to import

nearly all the nutrients necessary for plants to grow. "One of my colleagues refers to the soils in the Central Valley as basically hydroponics at this point," says Berhe, who spent more than a decade of her career just an hour up the road from Moua's farm, as a professor at UC Merced. "You pump them with enough water and nutrients, you can grow a crop anywhere."

Aware that ecological farming approaches are uncommon in these parts, Sam Vang had billed the event at Moua's farm as an "innovation farming workshop," hoping to convince farmers that the atypical practices on display were forward-thinking glimpses of the future. Considering the past fifty years of advice given to farmers by the agency Vang works for, the United States Department of Agriculture, it was an apt characterization. As the USDA has gradually warmed to agroecological methods—driven largely by farmers' interest in trying something other than chemicals that run up their debt—cover crops and compost are indeed new innovations.

But given the predominantly Asian crowd at the field day, the word "innovation" was a little ironic. After all, the Asian continent is where the US organic movement got the idea to use compost and cover crops. As early organic reformers astutely noted, soil-building strategies like these have sustained farming regions from India to Japan for many thousands of years.

"An Almost Religious Fidelity"

When University of Wisconsin soil physicist Franklin Hiram King took a nine-month tour of Asian farms in 1909, he was struck by the absence of mineral fertilizers, which most of his university colleagues considered essential. Instead, King observed, the farmers he met in China, Japan, and Korea "returned to their fields every form of waste which can replace plant food removed by the crops" with an "almost religious

fidelity." Impressed by the intricate systems of crop rotation and composting, King encouraged US farmers to follow suit. "These nations," King wrote in his classic book *Farmers of Forty Centuries*, "have demonstrated a grasp of essentials and of fundamental principles which may well cause western nations to pause and reflect."

But the farming strategy that most captivated King was a form of cover cropping he witnessed in rice paddies: a living mulch. Once rice plants were well established, farmers would sprinkle seeds right into their crop, seeds that would mature after the harvest into a vibrant stand of Chinese milk vetch. Just before the vetch flowered, the farmers would cut the nitrogen-rich cover crop and compost it offsite, later adding it back to the field just when the next rice crop needed a little fertilizer. Fertility wasn't the only benefit of this living mulch, though. The Chinese milk vetch also suppressed weeds, not only by shading them out but also by releasing allelopathic chemicals to inhibit their growth—just like squash in a milpa.

The English common name of the plant is apt, as the living mulch was used widely in China, home to the earliest recorded use of cover crops. In 500 BC, before vetch became popular, writer Chia Szu Hsieh recommended mung beans as an ideal soil builder—with sesame as a reasonable second choice. "Their fertilizing value," Hsieh crowed, "is as good as silk worm excrement and well-rotted manure." Hsieh's comparisons give a good indication of the Chinese approach to agricultural fertility at the time, which did indeed return biological materials to farm fields with "almost religious fidelity," to use King's turn of phrase. But even King's wording misses the mark, influenced no doubt by his attempt to translate what he saw for the twentieth-century American public. As Hsieh's 500 BC prose makes clear, Chinese farmers of the time did not see manure and rotting plants as waste. They saw them as a precious resource.

In the Lake Tai region, located in the Yangtze River Delta, farmers raised pigs specifically for their manure, utilizing the animals to transform their kitchen scraps into fertilizer. Human waste was composted and applied to the fields too, truly closing the nutrient loop. Grain crops were rotated with legumes, scavenging any nutrients that remained in the fields after the nitrogen-rich beans. Mulberry leaves were used to feed silkworms, silkworm excrement to feed pond-raised fish. "Traditional agriculture in China," writes agroecologist Luo Shilling, "used to be a system without waste."

It wasn't long before Chinese farmers learned to design agricultural systems that not only functioned on recycled nutrients but actually cycled the nutrients themselves. About 1,200 years ago, Chinese farmers started raising fish in rice fields, a practice that continues to this day. In such "co-cultures," fish poop can immediately be used as plant food. Moreover, the fish have learned that shaking the rice plants often rewards them with tasty insects, and they shake off about a third of pesky planthoppers in the process. Omnivorous, the fish also eat weeds—and chemicals released from their skin help inhibit diseases like rice sheath blight.

Following their success with fish, Chinese farmers began raising ducks in their rice fields as well. The birds were a bit more unwieldy, but also enriched the soil while reducing weeds and pests. Curiously, Chinese scientists have found, the gentle kick of duck feet stimulates rice plants to grow shorter and tougher, so they're less likely to fall down, or "lodge."

Although raising ducks in rice fields didn't take off everywhere, compost, cover crops, and crop rotation were widespread across the Asian continent for centuries. Closed-loop farming systems like those observed by King were commonplace in Japan, Korea, and India well into the 1900s, just as rotational swidden agriculture endured in Southeast Asia. Not until Norman Borlaug's Green Revolution came to the

continent—in the form of subsidized fertilizer and crops that relied on it—did farmers begin to change course. Indeed, as the industrial methods promoted by Borlaug began to undermine even US agriculture, it was Indian peasant practices that struggling American farmers looked to for an alternative.

Organic: A Movement with Asian Roots

In the early twentieth century, not long after Franklin Hiram King's trip to East Asia, the British government sent botanist Sir Albert Howard to India, which was then a British colony. Howard, the first director of the subcontinent's new Institute of Plant Industry, was instructed to teach modern scientific techniques to Indian farmers, presumably so the crown could collect more in taxes. Instead of teaching, however, Howard and his wife, Gabrielle Matthaei—also a botanist—found themselves learning. Like King, Howard and Matthaei were struck by the high level of fertility on the farms they visited, farms with no history of applying either chemicals or minerals. The duo carefully observed the farmers' practices, documenting what they saw. "By 1910," Howard wrote, "I had learned how to grow healthy crops, practically free from disease, without the slightest help from . . . All the . . . Expensive paraphernalia of the modern experiment Station."

Howard was particularly taken with the Indian farmers' system of composting, which he wrote up in English as the "Indore Composting Process." The process—and the philosophy behind it—would form the core of Howard's *An Agricultural Testament* and *The Soil and Health*—books that strongly influenced the organic farming movements in both England and the US. To this day, organic farmers cite Howard's famous Law of Return, declaring that all living matter that leaves the soil must somehow be put back. And they still compost in much the same way as Howard learned to do from Indian farmers.

Recycling organic matter back into the soil, as so many Asian farming systems were systematically designed to do, was for centuries the sole means of sustaining the fertility necessary to raise crops. There was simply no other way to supply plants with nutrients. But in 1909, while Franklin Hiram King was touring through China and Japan, a German scientist named Fritz Haber successfully demonstrated a process for synthesizing nitrogen. Instead of hauling manure around or procuring expensive minerals, farmers could now fertilize their crops with a jug of ammonium nitrate. Over the next few decades, synthetic fertilizer would become the darling of researchers, government officials, and of course chemical companies, which would earn windfall profits from selling their wares to farmers.

But much like Tuskegee professor George Washington Carver had done before him, Sir Albert Howard questioned whether commercial fertilizer was the equal of compost. While the two materials might be equivalent from a chemical standpoint, Howard argued, there was also a *biological* component to fertility. It was years before scientists like Aidee Guzman would unlock the secrets of tiny soil microbes, but with the help of Indian farmers who insisted their soils were alive, Howard had already caught a glimpse. To have truly healthy plants, he argued, you needed a *living* soil teeming with healthy critters that could not survive on fertilizer alone. They needed time-tested forms of sustenance: compost, mulch, or manure.

For Howard and the organic movement that followed him, replicating Asian farmers' methods of recycling organic matter was initially about soil fertility. This preoccupation was understandable; in the early twentieth century, soil conservation was a landmark environmental issue in both England and the US. Poor soils were widely seen as a dire threat to global food security and the survival of the human species.

But by the end of the century, the practices long maintained by Asian farmers would gain renewed attention in light of a new existential crisis: climate change.

With their commitment to recycling nutrients, Asian farmers did more than sustain farm fertility for some forty centuries. Their meticulously crafted, closed-loop systems also kept a lid on greenhouse gas emissions. Because nutrients were continuously being taken up and used by plants, they were far less likely to escape to the atmosphere as carbon dioxide, nitrous oxide, or methane. Meanwhile, cover crops and living mulches actually pulled carbon out of the atmosphere and stored it underground. Farmers would use some of this stored organic matter for future crops, but this too would eventually be recycled, as even human waste was returned to the soil. Meanwhile, a fraction of the carbon sequestered by cover crops would be routed deep into the soil profile, where it might stay for centuries. A synthesis of recent research estimates that even with current intensive agricultural practices, widespread cover cropping could store enough carbon to offset 8 percent of the direct annual greenhouse gas emissions from farming.

Using biological nitrogen also meant that traditional Asian farming systems weren't burning fossil fuels to make fertilizer, as industrial agriculture does today. Overuse of this synthetic fertilizer contributes to climate change not once but twice: generating emissions when it's manufactured and escaping from farm fields as nitrous oxide. This is one of the main reasons organic farmers lobbied hard for a certification system that disallows synthetic nitrogen, turning to strategies more like those long used in China, India, and Japan. Admiration for the farming systems developed in Asia is palpable in King's and Howard's writings, which largely give credit where it is due. And yet, even as early organic reformers in the US were adopting Asian farming *practices*, the US government was pulling out all the stops to exclude Asian farmers.

Asians Not Welcome

When Asian people first began arriving in significant numbers in the nineteenth century, US farmers welcomed the new immigrants—as workers. As the mining industry gradually declined, Chinese laborers who had come for the gold rush shifted to farm labor, helping build California's farm sector into the fastest growing agricultural economy in the country. By 1882, seven out of eight farmworkers in the state were Chinese. But by then, the US had spent a decade in economic depression, spurring widespread unemployment. Blaming Chinese immigrants for taking their jobs, rural Whites lobbied the federal government to pass its first discriminatory immigration law: the Chinese Exclusion Act of 1882. Though Chinese merchants and diplomats could still enter the United States, Chinese laborers were banned.

Or at least, they were banned on paper. In practice, many Chinese immigrants—with more than a little encouragement from their employers—found ways to continue working in agriculture, falsifying paperwork and exploiting loopholes in the law. But being illegal meant the Chinese were largely stuck at the bottom of the agricultural economy, forever working low-wage jobs for someone else.

While the Chinese Exclusion Act failed to completely eradicate the presence of Chinese farmworkers, it nonetheless slowed the flow of immigrant labor enough to concern California's increasingly industrial growers. To fill the gap, they looked to Japanese immigrants: by 1910, two-thirds of Japanese Americans working in California were employed in agriculture. Like the Chinese before them, Japanese workers were hired at the bottom of the wage scale—paid less than either Whites or Mexicans. But once established in an area, Japanese laborers used collective bargaining tactics to demand higher pay, threatening strikes when perishable crops were about to ripen. One contract negotiation at a time, these Japanese communities began to build wealth, pooling

money to rent land and then buy it. As more and more Japanese farmers purchased land, they hired more and more Japanese laborers—at higher wages than their White counterparts. They managed to take a promise always meant to be false—the idea that immigrant farmworkers could move up the "agricultural ladder" to own their own farms—and actually give it some truth. By 1920, Japanese farmers were growing about a third of all produce in California.

Unwilling to cede their grip on power, White farmers fought back, lobbying the California state government to pass a series of "alien land laws." The first such law, passed in 1913, prohibited noncitizens from owning land—and limited lease terms to three years. Though the law didn't specifically single out Japanese Americans, they were its clear target, as they constituted the largest Asian immigrant group legally ineligible for citizenship at the time.

Undaunted, immigrant Japanese farmers bought land in the name of their US-born children. Land purchased in the name of minors had to be placed in the guardianship of an adult, so Japanese immigrants found sympathetic Whites or Hawaiian-born Japanese American citizens (who had immigrated many years earlier) willing to serve as trustees. White allies also signed on as members of "dummy corporations," pretending to be stockholders of land that was actually managed entirely by Japanese immigrants.

Attempting to close such loopholes, California amended its Alien Land Law in 1920. Noncitizen Japanese farmers were no longer allowed to lease land at all. Nor could they be members of corporations that held title to land—no matter how many White people were also stockholders in the company. Again, Japanese Americans and their allies thwarted the law, this time by formally designating Japanese farmers as employee "managers" of land they were, in fact, illegally leasing. So in 1923, California updated the law again, this time enumerating

every verb that could possibly connote a relationship to land. Under the revised law, noncitizen Japanese were not allowed to "acquire, possess, enjoy, use, cultivate, occupy, [or] transfer real property." More than a dozen states passed similar laws, not only preventing Asian immigrants from holding land but forcing them off land they were already farming.

In late nineteenth- and early twentieth-century California, the story repeated itself with one Asian immigrant community after another: Chinese, Japanese, Filipino, Punjabi. They came as farmworkers. They hoped to become farmers. But they were systematically denied access to citizenship and land ownership, ensuring that agribusiness would always have access to a pool of legally insecure laborers. This was the model that would later be applied to Aidee Guzman's family and millions of other immigrant farmworkers.

Despite the fact that Hmong farmers came to the US legally—as refugees—they were nonetheless slotted into the same exclusionary social framework, which by the 1970s had been solidly woven into rural America's economic and cultural fabric. Although the US had long since updated the 1924 law that banned Asian immigration, farmers in places like Fresno hadn't quite relinquished that act's stated purpose, "to preserve the ideal of American homogeneity." Like other Asian immigrants before them, Hmong farmers faced the perception that they weren't American enough to be trusted. And much like the Japanese farmers of an earlier era, the Hmong struggled to overcome persistent fears that their collective work practices and communal economies would prove "unfair" competition to White-owned farms.

As Hmong farmers faced multiple forms of discrimination, they also had to negotiate the capital-intensive environment of California agriculture, one of the most heavily concentrated and industrialized farm sectors in the world. As a result, they mostly ended up farming on short-term leases, often renting land for just a single season. Farming

without secure land tenure put the Hmong in a precarious position. It also made adopting regenerative methods—including their own long-standing traditions—almost impossible.

"You Cannot Plant the Tree"

As the field day at Keu Moua's farm continued, Sam Vang moved on from cover crops and compost to showcase a much less common practice that Moua had recently implemented: hedgerows. Vang walked the crowd over to a double row of what looked like ornamental bushes, laid out along a drip irrigation line and surrounded by woodchip mulch. It wasn't just pretty landscaping, Vang explained, pointing to the almond orchard across the street.

One of the major issues in the Central Valley, Vang told me, is that small vegetable farms are often located right next to almond orchards, which are ubiquitous around Fresno. Standard management practices for almonds involve a lot of pesticides, Vang explained, and the nut harvest kicks up big clouds of dust. For Hmong farmers, whose specialty vegetables are sensitive to both chemicals and dust, this can mean losing large portions of their crop. Double-row hedgerows, Vang says, can help mitigate the problem. For the outer row, he recommends plants that can quickly grow to ten feet, providing a shield from dust and chemical drift. For the inner row, he suggests flowering plants that can host pollinators and other beneficial insects. Though Moua's hedgerow was just getting started when the field day guests came to check it out, she already had some of these insects buzzing around.

Ruth Dahlquist-Willard—the University of California farm advisor who's worked with hundreds of Hmong farmers in the Fresno area—led the portion of the field day focused on beneficial insects, sweeping her net through the nascent hedgerow. As Dahlquist-Willard collected insects from the hedgerow, she invited farmers to identify them on

the Hmong-language guides she'd brought, pointing out which good bugs were helpful for controlling bad bugs. The insects made a good showing, and Dahlquist-Willard registered genuine interest among several farmers. But she also knew that hedgerows need time to establish: researchers estimate that the return on investment takes about seven years, minimum. And while Keu Moua has that kind of time, most Hmong farmers in the Central Valley do not.

Moua understands what it's like to farm on a short lease, because she used to do so herself. "Because you rent, you cannot plant the tree," Moua said, gesturing to her high-value perennial fruit crops and her hedgerow. "You have to do vegetables, only year by year." Many Hmong farmers would like to build up their soil so it can support a healthier crop, Moua told me, but they can't be sure they'll still be there to benefit when these kinds of long-term strategies start to pay off. That's why buying land, which the Mouas did in 2002, can be such a game changer. "She and her husband saved all the pennies they had and they put it into that land," Vang says of Moua. "She's always thinking about how can I take care of this land."

Claiming a Place on American Soil

It's a sentiment that rings equally true for Nikiko Masumoto, who farms eighty acres of peaches, nectarines, apricots, and raisin grapes, just five miles south of the Moua place. Thirty-six-year-old Masumoto grew up on her family's orchard, where she was driving a tractor by age ten, but she never intended to stay. As a college student at UC Berkeley, the budding artist pursued interests in performance and social justice, earning acceptance to the master's program in performance as public practice at the University of Texas at Austin. Far from the conservative environment of the Central Valley, Masumoto nurtured pride in her Japanese American heritage and her identity as a queer woman. Urban

audiences embraced her work, and she would eventually be invited to perform her one-woman show at the White House.

But as Masumoto dug deeper into Japanese American history for her master's thesis, she came to appreciate her ancestors' struggles in a new light. As she reflected on what it had meant for her grandparents to purchase their land—and for her father to stay—the connection between her family's struggle for belonging and the challenges she'd learned about in her environmental studies classes at Berkeley started to sink in. As she would later tell NBC News, "I came to realize one of the boldest, perhaps courageous things I could do with my life would be to come home and become the next generation to work the same farm."

The first Masumoto to immigrate to the United States was Nikiko's great-grandfather, Hizoko, who came to California in 1899. Her great-grandmother Tsuwa was next, arriving in 1918. The young couple logged long hours as farmworkers, picking crops and pruning grapevines up and down the Central Valley. Raising five children on laborers' wages, they dreamed of buying their own farm. But as California's Alien Land Law grew ever stricter, Tsuwa and Hizoko despaired of ever being able to purchase their own land. Their dream had become illegal. So they kept working other people's fields and saving up, hoping their children might one day be able to achieve what they could not. As the Masumotos' nest egg grew, the prospect of such a future seemed possible. And then came December 7, 1941.

In response to the bombing of Pearl Harbor, the United States government swiftly rounded up thousands of Japanese Americans—many of them citizens—and incarcerated them in internment (i.e., concentration) camps. Between 1942 and 1945, some 120,000 Japanese Americans were sent to remote, makeshift prisons across the West—for no reason other than their ancestry. The Masumotos were sent to the Gila River War Relocation Center, fifty miles south of Phoenix in the scorching Arizona desert. In this harsh environment, they were again

tasked with farm work—this time to feed themselves. The incarcerated farmworkers relied heavily on daikon, or Japanese horseradish, since its spicy, starchy roots matured in less than two months. They found themselves eating it for every meal, even breakfast.

Twenty-year-old Takashi, the Masumotos' second-oldest son, was grateful for the farm work. As he would later tell his own son, it was "better than doing nothing." The energetic young Takashi, incarcerated just after his high school graduation, even signed up for a wartime emergency work program to harvest sugar beets in Montana. Anything, he said, just to get out of camp and off Block 23.

But there was one good thing about camp: Carole Sugimoto. The fifteen-year-old had grown up much like Takashi, working alongside her farmworker parents in the fields of the Central Valley. The whole Sugimoto family had been incarcerated after Carole's freshman year of high school, so the teenager had to earn her diploma at the only school she was allowed to attend: the improvised classroom at Gila River. For the Sugimotos, camp was particularly hard. Carole's father arrived at Gila River suffering from stomach cancer, then died within a month of the family's arrival.[56] Yet in the midst of tragedy, Carole found herself falling in love with a restless young man from Block 23.

When Japanese internees were finally released in the summer of 1945, life did not go back to normal. Families had lost homes, farms, businesses—three years of their lives. After serving in the army, Takashi Masumoto returned home to the Central Valley to find his parents—now fifty-three and seventy-three—living with four other families in an old grocery store, which they'd divided into rooms by hanging blankets. Determined to better their circumstances, Takashi found a barn for the three of them to live in and hustled farm work. He picked raisins. His mother joined a labor crew. His father pruned grapevines. Eventually, Takashi talked his way into a ranch management job with a tenant house, affording his family the dignity of running water and indoor plumbing.

In 1948, he married his sweetheart from camp, Carole Sugimoto. And in 1950, the family finally scraped together enough money to purchase a cheap forty acres, half of which was intransigent hardpan.

Determined to bring life to their little patch of earth, newlyweds Takashi and Carole gradually improved the soil. "My parents often used the Japanese term *bachi*, which roughly translates into 'what goes around comes around,'" their son would later recall. "I often heard 'take care of trees and vines and they'll take care of us.'" Beginning with grapes—some for drying into raisins and others for making cheap wine—the Masumotos eventually added peaches and nectarines to their growing farm, purchasing an additional forty acres in 1964. Their three kids helped with chores, and Taksahi's mom, Tsuwa, established a large garden where she grew food for the family's table: napa cabbage, Japanese eggplant, and even the daikon she'd once grown so sick of at Gila River.

With more opportunities than their parents could have ever dreamed of, the next generation of Masumotos looked to horizons beyond the farm. Takashi and Carole's daughter became a nurse in Los Angeles. Their eldest son became a computer scientist and invented a new circuit technology. Their younger son, David "Mas" Masumoto, went to UC Berkeley, majoring in sociology. As the increasingly industrialized agricultural sector squeezed out one family farm after the next, Takashi and Carole began preparing for the day when they'd retire their tractors and call it quits. But after graduating from college in 1976, Mas decided to come home for a while to help his dad. He never left.

The Struggle for Connection

When I asked Nikiko Masumoto about how she builds soil health on her farm, she rattled off all the things her dad, Mas, implemented when he converted his folks' place to organic. He applied load after load of

compost. He amended the soil with tons of manure. He planted cover crops too: red and strawberry clover, fava beans, and white vetch. All of these things, Mas learned, were practices his dad had once used as well, before he'd been encouraged to adopt synthetic fertilizers. The Masumotos were coming full circle.

"We do a lot of old-fashioned soil moisture testing too," Nikiko Masumoto told me, "as in, you get a shovel and dig, see what the top couple inches of soil look like. Is the color of the soil milk chocolate? Is it powdery white? Is it dark chocolate? I guess I like thinking about chocolate," she joked. But regenerative agriculture is about so much more than testing and amending soil, Masumoto stressed. "If we even just pause and think about the term regenerative," she says, "for me what jumps out is the idea of a generational connection. It's about a much deeper timeline of what it means to belong to a place."

Without that generational connection, much of the soil-building work on her family's land might never have happened, Masumoto says. When her dad decided to come back to the farm in the seventies, they planted trees her grandfather wouldn't have been able to tend on his own. And when she returned, three decades later, the horizon for investing in the land expanded again. "My dad says, as one farmer, you get forty harvests to study your land, to refine your craft," Masumoto says. "But when I came home, it doubled to eighty." There's no recipe for taking care of the land at her family's farm, Masumoto explained. Responding to the different needs of each season requires intimate memory of the place, an ability to read between the lines of a soil sample like you might parse the terse conversation of a taciturn family member rendered silent by trauma. "My dad just has years and years and years of notes of observations on the farm," she says.

For Masumoto, such long-term planning is essential for responding to climate change, which is already hitting hard in the Central Valley. Shortly after she returned to the farm, California entered a devastating

drought—the worst in recorded history by many measures. In just two years of the five-year dry spell, California farmers lost $1.7 billion, with 72 percent of those losses impacting the southern Central Valley where the Masumotos live. As their neighbors scrambled to find more water to save their crops, the Masumotos did a curious thing. They shut some of the water off. "If extreme drought is part of the future of our farm," Nikiko Masumoto said, "we want to know what it looks like if we irrigate less, mimicking what it might be like if we have less access to water in the future."

In order to cut off the water earlier for some trees in their orchard, Masumoto and her dad built furrows to stop their irrigation from reaching the end of each row. At the end of the summer, they sized up the end-of-row trees to see which had sustained the most damage. Some of the water-starved trees were clearly suffering, but not all of them. In certain rows, the reduction in irrigation was "virtually unnoticeable." The trees that did the best were the Sun Crest peaches, an orchard Mas had planted with his dad when he was twelve. The fifty-year-old trees showed few signs of stress, despite the historic lack of water. "The canopy of roots must be so extensive and developed," Nikiko Masumoto postulates, "that it helped the trees adjust and withstand drought more than our younger orchards."

Hanging on to trees for half a century sounds "completely insane" to a conventional peach farmer, Masumoto told me. I confirmed her assessment on a neighboring peach farmer's blog, which explained that "Year 4 through 8 are peak production times . . . by about year 12 the production amount has lowered so much that it is beneficial to the grower to replant a new variety." It's true that the Sun Crest orchards don't produce the highest volume of fruit, Masumoto says. But the trees carry so much family history that her dad couldn't bear to cut them down. The "emotional wisdom" of that decision, she said, is hard to separate from the ecological resilience it has bestowed on her farm.

Tackling Food Waste at Its Core

Shortly after Nikiko Masumoto was born, in the 1980s, the price for Sun Crest peaches plummeted. The Masumotos' fruit broker suggested they dump their Sun Crests: the box, Masumoto recounts, was worth more than the fruit. Mas refused, selling the twenty-pound boxes of peaches for fifty cents each. "We essentially paid people to eat our fruit that year," Nikiko Masumoto says, "because my dad could not bow to the waste mentality of that request."

The Masumotos' experience was no anomaly: waste has become one of the most pressing problems with the industrial food system. Project Drawdown, a global coalition of scientists researching climate solutions, estimates that approximately one-third of all food is wasted, accounting for roughly 8 percent of global greenhouse gas emissions. Food gets trashed all along the supply chain, rotting in fields when markets plummet and spoiling in transit when distribution and storage are inadequate. Even when food reaches its destination unscathed, it is frequently rejected by supermarkets for cosmetic deficiencies and sent to the landfill in large quantities by consumers and restaurants who simply buy or serve too much. As researchers have explained to me, we end up spending a third more energy, water, land, and fertilizer than we actually convert into food, all of which generates unnecessary emissions. Then, when the wasted food finally hits the landfill and decomposes, it generates methane—a greenhouse gas some twenty-eight times more potent than carbon dioxide. On the bright side, this problem of unused food represents a significant portion of humanity's climate footprint that could conceivably be reduced. Cutting back on the volume of wasted food, Project Drawdown's scientists estimate, could shave emissions by as much as ninety gigatons over the next thirty years—about six times as much as we might save by switching to electric cars.

Tackling food waste is most frequently discussed as a problem of logistics, a matter of plugging holes in distribution channels or properly aligning supply and demand. Over the past decade or so, an overwhelming number of startups have developed apps and software that allow people with excess food to connect to agencies that serve the hungry. Other tech-driven approaches to food waste include inexpensive refrigeration "bots" and technologies that extend the shelf life of produce. Nikiko Masumoto applauds such efforts, but she also thinks the food waste issue cuts deeper. She recalls how her grandmother saved boxes of used rubber bands and plastic forks, exclaiming *mottai nai*: don't be wasteful. This is why her dad couldn't throw out those peaches, she says. He respected them too much.

"In Japanese culture, there's a thing you say before you eat which comes from Japanese Buddhism," says Berkeley Food Institute director Nina Ichikawa, whose own Japanese American family struggled to hold on to their flower farm through the tribulations of alien land laws and incarceration during World War II. "*Itadakimasu.* It means I gratefully accept this food, but also, I acknowledge the laborers who grew it, I acknowledge the trees, I acknowledge the farm, thank you to everybody who brought it to me. You're supposed to go down the whole list in your mind of how it got to your plate."

A culture that understands food with this kind of reverence is less likely to waste it, Ichikawa believes. It simply becomes too valuable to throw away. "It's more efficient to teach people that the whole system is connected and that it's related to the core life force that made you," Ichikawa says, "rather than screaming at them, don't throw away something. You make the food higher quality from the beginning and every bit of it is important rather than making cheap shit food that you don't mind to throw in the garbage."

It's important to treat food waste as the systemic social problem it is, Masumoto agrees, rather than some kind of personal failing. As proud

as she is of her dad's decision to save the Sun Crests, she understands why such actions aren't more common. "What are farmers supposed to do when the price of the market is less than the price it costs to harvest it?" she asks. For her part, Masumoto attempts to tackle waste on all three fronts: lobbying government to fix systemic problems, fostering reverence for the everyday miracles that give us food, and applying her grandmother's philosophy of *mottai nai* in her day-to-day operations. When she was growing up, Masumoto said, the family had a practice of donating any fruit that was not cosmetically approved for sale. But shortly after she came back to farm with her dad, they ran into a problem. "We had so much," she recalls with frustration, "that some of the organizations we donated to couldn't take any more fruit. We had this amazing tasting fruit and no place for it."

The surfeit of unmarketable fruit was yet another casualty of the drought, Masumoto explained. To conserve water, she had cut back on irrigating her family's Gold Dust peaches, reducing the flow some 20 to 30 percent. The result was actually quite tasty, she said, since the lack of water concentrated the peach flavor. But their buyers said the apricot-sized peach was too small. No one would want it. No more willing than her dad to throw away fruit she'd worked so hard to grow, Masumoto launched an #EatSmallFruit campaign on social media, reaching out to buyers willing to tell the story of the petite peaches. She also started a drive-through program to sell the fruit directly, which she dubbed the "O, U Fab! Club": Organic, Ugly, and Fabulous. The small fruits weren't just "seconds," Masumoto wanted her customers to understand, they were flavorful, ecologically raised treasures that happened to look different than corporate supermarkets have led us to expect. "Move over narrow definitions of beauty," she wrote to the club's members. It's time to "radicalize how we view the aesthetic value of food."

By highlighting everything this fruit is connected to—climate adaptation, queer pride, a family farm trying to save water for their neighbors—the Masumotos have built a community around the small and oddly shaped peaches. As I learned when I drove out to the farm to purchase one of the boxes myself, loyal customers travel for miles to pick up their fruit—even in the midst of a heat wave or a pandemic—posting recipes and photos of their creations on social media. Joining something like the O, U Fab! Club appeals to our hunger to be part of something larger, Masumoto believes, a fundamental human desire to be connected to where our food comes from. While this kind of know-your-farmer enthusiasm for local food might seem like par for the course in California, Masumoto explained, it wasn't like this when her dad was her age. Like everything else that made her family's farm possible, it had to be built from scratch.

The Asian Origins of California Cuisine

When Mas Masumoto decided to convert his family's farm to organic and embrace older peach varieties like Sun Crest, he was essentially breaking up with his fruit broker. Warehouses weren't interested in juicy peaches—or juicy stories. They wanted newly developed peach varieties that ripened redder, with a longer shelf life. They wanted fruit that was chemically guaranteed to be blemish free. But many Japanese American consumers were more discerning, says Berkeley Food Institute director Nina Ichikawa. They demanded high-quality, fresh, local produce, and they were willing to go the extra mile to find it. To ensure a supply of such produce, two Japanese American men started small grocery stores in Berkeley, which would blossom into the iconic Berkeley Bowl and Monterey Market. These were the markets that gave Mas and his peaches a shot, transforming "old and ugly" to "heirloom and organic."

At the same time, it was Bill Fujimoto of Monterey Market who helped Chez Panisse chef Alice Waters build a new culinary movement

around fresh produce, Ichikawa says, laying the groundwork for farm-to-table dining. Fujimoto's efforts built on the path-breaking success of another Japanese American family, the Kushis, who founded one of the country's first natural food markets. What we now call "California cuisine," Ichikawa says, has deep Asian American roots. And yet, despite the key role of Asian Americans in building these premium farm-to-table markets, few Asian American farmers actually have access to them. It's an irony that troubles Nikiko Masumoto, who doesn't want her farm to be the exception. Looking around Fresno, she sees recent Asian immigrants still facing the same struggles her ancestors did.

As a fruit grower, Masumoto has to buy her vegetables, many of which she purchases from local Hmong farmers like Keu Moua. None are certified organic. Several of her Hmong neighbors continue the same type of farming they did generations ago in Southeast Asia, Masumoto notes, growing a diverse mix of crops and using hand labor instead of chemical labor. Many of these farms would meet organic standards if they were assessed. But the structures that are set up to support sustainable and regenerative farming don't meet their needs. "Very few organizations have staff members that are Hmong, or speak Hmong, or have staff members in the Central Valley," Masumoto says.

Leaving the Hmong out of regenerative organic farming initiatives is not only unjust, Masumoto explains, but a huge missed opportunity. "So many Hmong farms are still small scale," she says, "and when we're talking about the management-intensive realities of a lot of regenerative agriculture practices, small scale becomes an asset." As US agriculture has become more concentrated and mechanized, Masumoto says, farm communities have lost the skills for working directly with plants and soil, recycling nutrients in the closed-loop systems that made the Asian continent such a source of inspiration for the organic movement. If our nation's farm sector is going to change course in time to meet the climate challenge, we'll need to look to farmers who still have those skills—like the Hmong. "We need those small farmers," Masumoto says. "We need the people who can walk the fields and observe things."

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Ultimately, Masumoto believes, the future of regenerative agriculture hinges on whether the people needed to practice it are afforded stable access to land. The possibility of belonging to a place—of being intimately connected to lives beyond our own—is central to healing our soils and our climate, she says, and it's exactly what's been stolen from immigrants like Masumoto's ancestors. We often point the finger at farm policy for destroying our rural environment, she says, but immigration policy and racialized incarceration are to blame as well. With the government systematically separating families from one another, ripping people away from any connection to land, it's no wonder there's not more organic matter beneath the surface of rural America. People were never allowed to put down roots.

CONCLUSION

Healing Grounds

The communities featured in this book—the Indigenous, Black, Latino, and Asian Americans who are often collectively referred to as people of color—make up nearly 40 percent of the US population. They also account for more than 60 percent of the current population of agricultural laborers and an even more significant share of the historical agrarian labor force. By the time you start trying to quantify how many hours of Indigenous labor went into building up the soils that supported the past two hundred years of European American agriculture—not to mention the food and sustenance Indigenous peoples provided to settlers when they arrived—it becomes readily apparent that the US food system is almost entirely built on the work of Black and Brown people.

And yet, people of color own just 2 percent of the agricultural land in this country. If you grew up learning, as I did, that economic opportunity in the US is based on the philosophy of John Locke—that one earns property by "[mixing] labor" with the soil—this statistic is more than a little disconcerting. It's arguably one of the deepest forms of hypocrisy undermining our democracy, on par with voter suppression and grossly disproportionate mass incarceration. What's more, the total

land area held in trust for recognized Native American tribes—the original stewards of the entire continent—is more than sixteen times smaller than the US agricultural land base, and the majority of these Indigenous lands are actually leased to White farmers and ranchers. This stark inequality in agricultural land ownership is not only unjust, it's also holding back regenerative agricultural practices—techniques that are rooted in the ancestral traditions of these very communities of color—that we desperately need to combat climate change.

"Everything goes back to the land," says Stephanie Morningstar, co-coordinator of the Northeast Farmers of Color Land Trust. "If you want to heal—the planet, our communities, racism—it's going back to the land together." Morningstar, a close ally of the Black Farmer Fund who I met through Olivia Watkins, is well versed in the connection between land and climate: in her previous job, she was actually a climate change researcher. But while Morningstar's research helped her understand how current land management worsens climate imbalance, it was her journey to reckon with her own family's past that brought her to working on solutions.

"It Always Ties Back to the Land"

In April 2010, Morningstar's mother went to the hospital with what she thought was pneumonia. While Morningstar sat with her mom in the emergency room, a doctor came in and broke the news that she had stage IV ovarian cancer. She was dead within a week. "It was really intense for my family to lose our matriarch," says Morningstar, who cites her mom as her fiercest advocate and the person who helped her develop a relationship with land. "It set me on a quest to basically avenge her death."

To understand her mother's death, Morningstar first needed to find out more about her grandfather. Raised in Ontario near the Six Nations of the Grand River territory, the Indigenous youth had been sent to

a residential school far from his community. Just like the boarding schools in the United States, Canadian residential schools used brutal tactics to "kill the Indian in the child," ripping children from their families and inflicting violent punishments when they spoke their own language or begged to be sent home. When Morningstar's grandfather emerged, he carried with him the scars of that traumatic experience. He moved to the United States and raised his family in western New York State, never speaking of his homelands on the other side of the border. To protect his family from the violence he had experienced, Morningstar's grandfather discouraged them from identifying as Indigenous or connecting to their heritage. And having been violated by Western institutions, he passed down a deep fear of Western medicine.

"The way that manifested in my mom is that she avoided the doctors all the time," says Morningstar. "And yet we weren't close to a place where we could do traditional medicine and because of our disconnect from our culture, we weren't able to access that type of medicine." Haunted by the harsh lights of the ER and the condescending doctor who had tersely delivered the news of her mom's death sentence, Morningstar vowed to create places where people like her mom could heal.

In 2012, Morningstar went back to the Canadian reserve where her family comes from, Six Nations of the Grand River, and cofounded an integrative healing clinic with a Mohawk physician and a Cayuga medicine helper. (The Mohawk and Cayuga are part of the Six Nations, or Haudenosaunee Confederacy, whose homelands stretch across the contemporary border between the United States and Canada. Morningstar identifies as Mohawk.) As she connected more strongly to her culture, Morningstar began to look at health differently. It wasn't just about caring for individual human bodies, she realized. "Really it's that connection between the land and ourselves, that's where our health comes from," Morningstar says. "And it's reciprocal—we have responsibilities to land."

With the encouragement of her mentors at the clinic, Morningstar went back to school for ethnobotany. There, she became an advocate for an Indigenous-led approach that maintained botanical knowledge within a larger cultural context. While in school, she agreed to help build an Indigenous conflict resolution framework for the child welfare system in Ontario, Canada, which led her on a journey across Ontario, learning about customary practices for conflict resolution.

"Again, it was tied to land," Morningstar reflects. "Any system that we're connected to—legal systems, governance systems, child welfare systems, the health care system—if you want to understand how we relate to each other and the world around us, it always ties back to the land." Land, however, was precisely what Morningstar and many of her Indigenous colleagues did not have access to. Morningstar's grandparents had squatted on a rotating series of parcels to grow subsistence food for the family. She herself had begged landlords for a place to raise her medicinal herbs, eventually getting permission to farm a piece of land under a walnut tree. "You can't grow anything under a walnut tree," Morningstar says, exasperated. "Everybody knows that."

Morningstar got excited when she learned about a mountaintop property in Vermont, surrounded by lush eastern woodlands. The herbalist who owned the place was looking to pass it on to a new steward, and Morningstar began dreaming of making a life there. "And then I found out that a wealthy White herbalist with tons of access to resources and capital bought it, for something over $1.5 million," Morningstar recalls. "It completely cut me off from any sense that this could be a reality for me."

By this point, Morningstar had become an outspoken advocate for rematriation of land to Indigenous communities, and she was gaining recognition for her activism within the herbalism community. Here was a group, Morningstar reasoned, that expressed profound reverence for Indigenous traditions—and that also happened to have a lot of wealthy

members who owned large tracts of land. If rematriation was going to happen anywhere, this seemed like a promising place to start. Morningstar was heartened when the new owner of the Vermont property came up to her at a conference, expressing her intention to return the land to its original Abenaki stewards. But to Morningstar's dismay, the woman's words were just an empty metaphor. "To me, to even speak those words is to make a contract with the universe," Morningstar said. "But nothing ever happened."

Morningstar continued practicing herbalism but also worked as a researcher at McMaster University in Hamilton, Ontario, where she collaborated on Indigenous-led research projects dedicated to answering community-driven questions regarding climate change. Then friends started sending her a job description: a newly formed land trust was advertising a leadership position. "People kept sending me this job description," Morningstar recalls, "and they're like, you need to apply for this. I'm thinking, it's in the States. I'm in Canada. I already have a job." Finally, on the day before the application was due, Morningstar opened the job ad. It was Halloween, just before All Souls' Day and Día de los Muertos, and Morningstar was thinking about her mother. "Her fantasy had always been to build something called Shulerville," Morningstar told me, explaining that her mother's maiden name was Shuler. "All it was, she just wanted a piece of land where she could build a small house and then I could build a small house, and my sisters could and my aunties could, we could all live together and communally garden and feed ourselves and make things together."

When Morningstar opened up the job ad, she zeroed in on the mission of the new organization, which called itself the Northeast Farmers of Color Land Trust. She read that the group had formed to advance permanent, secure land tenure for Black, Indigenous, Latino, and Asian farmers, to steward the land in "a sacred manner that honors our ancestors' dreams."

"As soon as I read that," Morningstar remembers, "I thought, that's Shulerville."

Morningstar submitted her application, and within weeks, the new co-coordinator of the Northeast Farmers of Color Land Trust was spending her days figuring out how to make good on that mission. She knew there were thousands of people like herself, carrying ancestral responsibilities that could help rebalance power while healing their communities, the soil, and the planet—if only she could help them get secure access to some of that 98 percent of US farmland still in White hands.

And yet, Morningstar reflects, the problem is deeper than White ownership. If we want to manage the US landscape in a way that brings balance back to our planet, we not only need to question the Euro-American monopoly on farmland ownership. We have to question the Euro-American idea that land should be owned in the first place.

When Land Is Fungible

In 2018, a young attorney named Neil Thapar drove across the country, consulting *An Indigenous Peoples' History of the United States* as a sort of field guide. "It cracked something in the training that I got as an economics student in college," Thapar recalls, "where land is treated as just some factor of production, a piece of capital that's interchangeable. In economics, they taught us that one piece of land can be bought and sold in replacement for another piece, in the way that money or some other object can be."

Thapar had gone on from his economics degree at UCLA to earn a law degree at the UC Hastings College of the Law in San Francisco. After finishing his JD, he'd taken a job leading the Food and Farm program at the Sustainable Economies Law Center in Oakland, where he'd been working on strategies to gain land access for a wide range of clients. One day, Thapar was trying to help urban tenants access gardening

space. The next, he was trying to help immigrant farmers navigate complex lease agreements. As he continually bumped up against the same barriers, Thapar became frustrated. "That's the backbone of our entire economic system is that land is something that can be traded and that is fungible," Thapar said. "And yet on that cross-country trip, reading that book, I saw how false that is. How unique each piece of land is. And the attention and care that is demanded of us because of that."

As Thapar was trying to figure out some way through these immense structural barriers, he got a call from his longtime friend Mai Nguyen. Nguyen, a farmer and activist whose day job also involved navigating hostile legal and bureaucratic systems to try to secure land access for farmers of color, was ready to try a new approach. The two made a pact to leave their jobs and start a new kind of land justice project: one that would honor land as a relation, not merely a piece of capital.

Like Thapar, Nguyen (who uses they/them pronouns) had come to land access work through a blend of formal training and personal experience. Born in San Diego to Vietnamese refugees, Nguyen studied climate science at UC Berkeley, which eventually led them to pursue a career in regenerative farming. Nguyen drew up a long-term farm plan, building on the ecological relationships among each element of the farming system. "I come from this background of climate research and being raised Buddhist," Nguyen says, "so I've always been taught to see the interconnections of the world and to think about community and the future."

But just one year into what was supposed to be a five-year term, Nguyen's landlord broke the lease. "Sustainability depends on planning for the long term," Nguyen explains, "and without land tenure you just cannot plan. You cannot implement your mushroom inoculation system that requires at least three years to break down carbon material into really rich soil organic matter." Nguyen went on to become a leader in California's local grain movement and something of a celebrity among

bakers, cobbling together leases and raising a whopping twenty-five varieties of diverse, locally adapted grains. Farming without chemicals or irrigation, Nguyen avoided conventional tillage by using sheep for weed management and draft horses for broadcasting seed. Heralded as a regenerative farming success story, Nguyen knew the truth: in order to farm, they had to commute over eight hours to land that could be sold out from under them at any minute. It was not sustainable.

The good news for anybody working on farmland access, Nguyen and Thapar explained, is that a historic swath of the nation's agricultural land is likely to become available as older farmers age out of the profession. Some estimates suggest that some four hundred million acres—half of the total farmland in the US—could change hands in the next decade or so. But the bad news is that virtually none of these acres appear to be destined for futures as milpas or buffalo pastures or agroforests. They are not likely to fall into the hands of tree-conserving Black farmers like Olivia Watkins, prairie-restoring Indigenous communities like the Blackfeet Nation, or soil-building immigrant farmers like those with whom Aidee Guzman conducts research. In fact, quite a lot of land transfer has already happened in recent years, Nguyen and Thapar told me, and not in the direction of regeneration or equity. Instead, these land deals have led to concrete and consolidation.

Incredibly, just as scientists are clarifying the key role of agricultural lands in fighting climate change, those very lands are being paved over. According to the American Farmland Trust, 25.1 million acres of US agricultural land—nearly the size of the state of Ohio—were converted to developed uses between 1982 and 2015. The climate implications of this land transition are staggering: a 2012 University of California, Davis study that compared an acre of urban land to an acre of irrigated cropland found that the urban land generated seventy times as many greenhouse gas emissions.

Meanwhile, the agricultural lands that remain are being consolidated. When retiring farmers sell, parcels are frequently purchased by deep-pocketed institutional investors (like pension funds), which manage the lands as financial assets rather than ecological systems. Teachers Insurance and Annuity Association of America (TIAA), one of the largest pension fund managers in the country, now owns nearly two million acres of farmland, worth almost $6 billion. In the Mississippi Delta region alone, the pension giant owns nearly as much farmland as all the Black residents of the region combined.

So long as land retains a legal identity as a fungible piece of capital, Nguyen and Thapar believe, it will be nearly impossible to bid against giants like TIAA, whose interest in land is purely extractive. If regenerative agriculture is going to have any chance to scale out to the extent necessary to address our climate imbalance, we have to shift the way we relate to land.

A Space for Un-Property

Morningstar walked me through the Northeast Farmers of Color Land Trust's approach to this work of reimagining land relations. The nonprofit, Morningstar explained, is actually a hybrid of two different types of land trust. On the one hand, it operates as a community land trust, drawing on the model innovated in 1969 by Black farmers Shirley and Charles Sherrod when they created the New Communities collective farm in Albany, Georgia. At the same time, it also operates as a conservation land trust, drawing on a model ordinarily used to conserve wilderness but increasingly being applied to preserve the ecological integrity of agricultural lands as well. Given that community land trusts typically have a mission to expand access (usually to affordable housing in high-rent urban cities), while conservation land trusts typically aim to restrict it (in the interest of protecting nature), Morningstar has gotten some funny looks when she tells people that Northeast Farmers

of Color Land Trust is a hybrid of the two. But that's exactly the point, she says. "Our understanding is that reconnecting people with land—particularly people of color—can be beneficial for both sides of that equation."

In the short term, the land trust negotiates equitable leases for farmers of color, vetting landowners to ensure that terms are fair and that the place and relationship provide a "safer space." Longer term, the trust aims to acquire at least two thousand acres of land, with the goal of providing affordable, long-term leases to some fifty farmers of color who commit to regenerative agriculture covenants. But the work isn't just about land acquisition, Morningstar explained. It's also about ensuring that farmers have the resources and training needed to succeed. In addition to connecting farmers with free technical assistance, the trust matches farmers with culturally appropriate business planning services and helps them access markets for their products. The trust also collaborates with "The Ecosystem"—a collective of five organizations dedicated to advancing the success of Black farmers, including the Black Farmer Fund, led by Olivia Watkins, and Soul Fire Farm, where Watkins once apprenticed and now sits on the board. Finally, the land trust uses its platform to advocate for climate justice and food sovereignty policy, pushing for reform to laws and public programs that have long discriminated against farmers of color and prevented them from accessing land.

Most importantly, Morningstar emphasizes, the land trust doesn't do anything without first consulting the Indigenous communities who are the original stewards of the land. Regardless of whether the US federal government has "recognized" a particular Indigenous community, they begin any discussion about land by reaching out to the traditional Indigenous governance bodies for that place. "My question to them is essentially, if we are going to be receiving a donation of land in your territory, what would you like us to do?" Morningstar explains. "Rematriation? A land tax? Do you want seeds stewarded on these lands?"

One of the primary tools Morningstar uses to work toward shared sovereignty is something called a "cultural respect easement," which stipulates specific forms of Indigenous access or Indigenous-informed management of land. As a hypothetical example of such an easement, Morningstar explained that a Vermont landowner in Abenaki territory might have a number of ash trees on their property. The Abenaki, who make traditional baskets using ash trees, might negotiate an easement with the landowner, who could agree to call a designated representative whenever an ash tree fell, so that the Abenaki could harvest it. Such easements could also grant access for hunting, harvesting, ceremony, reburial of ancestors, or simply be open to definition by the nation, Morningstar told me.

For Morningstar and her team, the ultimate goal is to bring all the threads of their work together into a several-hundred-acre community. This community would integrate all the functions of the land trust, with space for incubator farms, common areas for food production, childcare and health care services, and ongoing ecosystem restoration. Informed by shared sovereignty with Indigenous original stewards, the community would recognize the personhood of nonhuman beings, who would have explicit rights within its shared governance system.

As the co-coordinator of a land trust that both wants to acquire fee-simple titles and, ultimately, to abolish them, Morningstar finds herself in a complex position. "A land trust is meant for perpetuity," she explains, "so we need to be able to take our time and do it right if we want to ensure that this lasts forever." Then she pauses. "Or at least as long as the colonial system that supports a legal entity like a land trust," she clarifies. "We say land sovereignty when we talk about our work, but to be honest, land won't be sovereign until this system doesn't exist anymore."

Nguyen and Thapar confront a similar dilemma, as they aim to create an analogous network of communally managed land in California.

Suffering from land insecurity themselves and seeing the urgent need for farmers of color to attain secure land tenure, they have steadily gathered colleagues to mount a concerted effort to gain farmland. The pair have named their project Minnow, and they were initially reluctant to even characterize it as an organization or charter it as a nonprofit. "To have a pathway toward something different, we need to use the tools that are available to us in certain respects," Thapar explains, choosing the word *container* to describe what Minnow is. "But I also want us to be able to embody and provide a way in which we can use the tools available to us but also think beyond them."

Like Morningstar, Nguyen and Thapar have established a land acquisition fund to secure farmland. They are now designing "creative means" to enable land tenure for farmers of color and worker ownership of farm businesses, while furthering indigenous sovereignty and rematriation. They have begun building an Indigenous consultation process, and they are working with farmers of color to identify properties and fundamental infrastructure needs for their operations to be successful. No matter how much capital Minnow raises—and their goals are ambitious—they know they could never buy out the entire California farm sector. But that's okay, Thapar says, because the process they hope to catalyze starts in people's imaginations.

"My hope is that the concrete steps we take toward community control of land create more space for dialogue, so that we build from the collective wisdom that exists of alternative models of relating to land," Thapar says. Indigenous Californians have a wealth of such wisdom, he adds, as do many people whose ancestors built long-standing relationships with other lands that were subsequently colonized. Thapar cites his own family's experience of being assimilated into the US property system, having spent generations in India. In India, Thapar says, precolonial relationships to land have persisted, at least in pockets, so there are places where land isn't entirely a fungible commodity. "Even if you don't practice [these land relations] yourself, you think it's possible because it exists within your eyesight or at least you hear about it," Thapar says. "Whereas here [in the US] that's not the case for so many of us." By creating a few, interconnected oases of un-property, Nguyen and Thapar hope to foster confidence that a different way of relating to land is possible. Such confidence, they believe, could drive the public policy change needed to actually achieve that vision, so that regenerative farmers of color can apply their ancestral knowledge at the scale needed to make a dent in climate change.

There are signs this may be starting to happen. In early 2021, Congress approved Senator Raphael Warnock's bill to provide $4 billion in debt relief for farmers of color, plus an additional $1 billion to help these farmers acquire land and form cooperatives. As this book goes to press, Senator Cory Booker is still pressing Congress to pass his bill, which would grant up to 160 acres of land to both current and aspiring Black farmers. Many of the farmers of color who helped design these policies had experienced land reforms at a hyperlocal scale, through a collectively managed garden or farm led by members of their own communities. "Once it feels like something you can touch," Thapar remarks, "it feels more real."

Healing Grounds

As I spoke with the trio of land justice advocates, I realized how fully my understanding of regenerative agriculture had shifted. In the beginning, I'd pored over research papers about carbon sequestration and soil organic matter, trying to pin down the potential for agricultural climate solutions in technical terms. Then I'd started visiting farmers, hoping to learn about the regenerative practices they were implementing to capture carbon and reduce emissions. But when it became clear to me that many of the communities with the strongest commitments to a

regenerative food system were lacking secure access to land, I had to take a step back. It wasn't just individual farming practices standing in the way of agricultural climate solutions. It was our society's entire way of relating with land—and with each other. The extraction of carbon from soils was just one integral piece of a much larger process of extraction, a process that included the theft of indigenous lands, the forced enslavement of millions of Africans, and the extortion of immigrant labor. To repair the soil, we needed to repair it all.

Talking with Nguyen, Thapar, and Morningstar was a perfect opportunity to explore my original question about how much carbon could be drawn down through regenerative agriculture. Morningstar had recently been a full-time climate researcher, and Nguyen's professional background included generating climate models and analyzing soil carbon. Both had considerable experience practicing regenerative farming techniques, as did Thapar. But the longer we talked, the more we kept coming back to the intricate mechanics of an even deeper process: colonialism.

I had been preoccupied with a narrow question: how many tons of carbon can farmers suck out of the atmosphere and store underground? Pinning down this number proved elusive, as scientists pointed out the dizzying array of variables involved, from soil types to crop varieties to the length of time you assumed a particular form of management would be sustained. Truthfully, they admitted, we're just beginning to understand how to measure the movement of this tiny, consequential element. What we do know, however, is that carbon cycling works pretty well in healthy, functioning ecosystems.

Wondering if I'd failed to look at the most fundamental question underlying my whole project, I eventually asked Stephanie Morningstar a very unformed question. I'm sure the words didn't come out in this order, but the essence of it was this: so what *is* the climate crisis, I mean, really?

"This is ancestor work," Morningstar answered. "Everything that we're doing is ancestor work. Not just me, not just Black folks, not just people of color. Everybody."

Climate change signals a profound imbalance, Morningstar explained, rooted in the violent restructuring of relationships between people and land that lies at the very heart of this continent's history. This rupture disrupted the connections that make healthy, functioning ecosystems possible, including the connections that weave humans into the fabric of a place. That means the vital work of rebuilding soil carbon is inextricably woven together with the vital work of racial justice.

"What we are doing is we are healing our ancestral lineages," Morningstar clarified. "It's about going back to the root issues: Indigenous land dispossession and enslavement. How do we right those relationships between our own communities so that we can heal those things in this healing ground."

So healing the climate means healing land, I asked, trying to follow Morningstar's train of thought, and healing land means healing colonization?

"That's it," Morningstar said. "That's the work."

Beyond UC Santa Barbara, I am also supported by a worldwide network of agroecologists, writers, and geographers who are the most brilliant, selfless people you'll ever meet. I am particularly grateful to my frequent writing buddy and thought partner, Maywa Montenegro, who is not only a stalwart friend but is also responsible for seeding most of my better ideas.

The Carlisle, Holder, and Archie families have held me in the most loving embrace throughout my long, winding search for a deeper understanding of this world and my place within it.

I wrote this book during the coronavirus pandemic, physically distanced from all my friends and family members—except for one. It was Patrick Archie who singlehandedly transformed my quarantine into a writing retreat, insisting that we dedicate the brightest and most spacious room in our house for my work. For months, Patrick harvested and cooked many of my suppers—and much of the early development of this book happened in those long dinner conversations, as I drew heavily on Patrick's deep well of experience as a farmer and agroecologist. He has quite literally supported me every step of the way, and I could not ask for a better partner.

Notes

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