Liebenberg, Louis. 1990. *A Field Guide to the Animal Tracks of Southern Africa.* 1st ed. Cape Town, South Africa: D. Philip.

Mathews, Andrew S. 2018. "Landscapes and Throughscapes in Italian Forest Worlds: Thinking Dramatically about the Anthropocene." *Cultural Anthropology* 33, no. 3: 386–414.

Mavhunga, Clapperton Chakanetsa. 2014. *Transient Workspaces: Technologies of Everyday Innovation in Zimbabwe.* 1st ed. Cambridge, Mass.: MIT Press.

Milton, Shaun. 1997. "The Transvaal Beef Frontier: Environment, Markets and the Ideology of Development, 1902–1942." In *Ecology and Empire: Environmental History of Settler Societies,* edited by Tom Griffiths and Libby Robin, 199–212. Melbourne, Australia: Melbourne University Press.

Rose, Deborah Bird. 2004. *Reports from a Wild Country: Ethics for Decolonisation.* Sydney, Australia: UNSW Press.

Tsing, Anna Lowenhaupt. 2015. *The Mushroom at the End of the World: On the Possibility of Life in Capitalist Ruins.* Princeton, N.J.: Princeton University Press.

Turnbull, David. 1997. "Reframing Science and Other Local Knowledge Traditions." *Futures* 29, no. 6: 551–62.

Verran, Helen. 2001. *Science and an African Logic.* Chicago: University of Chicago Press.

Verran, Helen. 2013. "Engagements between Disparate Knowledge Traditions: Toward Doing Difference Generatively and in Good Faith." In *Contested Ecologies: Dialogues in the South on Nature and Knowledge,* edited by Lesley Green, 141–61. Cape Town, South Africa: HSRC Press.

Viveiros de Castro, Eduardo. 1998. "Cosmological Deixis and Amerindian Perspectivism." *Journal of the Royal Anthropological Institute* 4, no. 3: 469–88.

Viveiros de Castro, Eduardo. 2004a. "Exchanging Perspectives: The Transformation of Objects into Subjects in Amerindian Ontologies." *Common Knowledge* 10, no. 3: 463–84.

Viveiros de Castro, Eduardo. 2004b. "Perspectival Anthropology and the Method of Controlled Equivocation." *Tipití* 2, no. 1.

Watson-Verran, Helen, and David Turnbull. 1995. "Science and Other Indigenous Knowledge Systems." In *Handbook of Science and Technology Studies,* 114–39. Thousand Oaks, Calif.: SAGE.

Willerslev, Rane. 2004. "Not Animal, Not Not-Animal: Hunting, Imitation and Empathetic Knowledge among the Siberian Yukaghirs." *Royal Anthropological Institute* 10, no. 3: 629–52.

CHAPTER 4

Plants of Internal Colonization

Critical Descriptions of Agrarian Change through Plant Agencies in South India

DANIEL MÜNSTER

Walking the gardens of natural farmers in the highlands of Kerala offers a glimpse into an alternate history. What if small-scale farmers had embraced agroecology rather than the temptations of agrochemistry and monoculture? As I followed Mr. John, a retired teacher, through his five acres of tropical forest garden, the scene changed with every slow and barefooted step that we took. Seemingly proud and eager to share his knowledge, he helped me notice that edible, medicinal, or simply beautiful plants were growing everywhere around us, above and below. John was an admirer of the environmentalist and biologist Rachel Carson (1962) and followed the teachings of the Japanese farmer and alternative agronomist Masanobu Fukuoka (2009). His one-acre garden produced an abundance of diverse crops: pepper, areca nuts, coffee, ginger, grass for his cow, cardamom, coconut palm, jackfruit, and a variety of tubers and vegetables, and plenty of small edible plants grew in different spots of his surroundings. I had met Mr. John, widely known in the region by the honorific John Master, to talk to him about the series of farmer suicides that had afflicted Wayanad district in recent years. He was among the first interlocutors I met who explained farmer suicides not primarily in economic terms. Instead, he drew my attention to the role that plants played in individual and collective stories of suicide, death, and ruin. As he gave me the tour through his plot, he singled out leguminous plants and explained their nitrogen-fixing capacities. John also pointed to edible plants that have the capacity to grow and produce food in abundance, and he explained the importance of old trees for

providing shade and moisture to the plot. To his regret, however, these plants were no longer cultivated in Wayanad, a region now famous for chemical-based, intensive, cash crop cultivation, such as ginger. By cultivating "old" plants, John highlighted the possibility of an alternative to the cost- and chemical-intensive farming practices of mainstream agriculturalists.

As we walked and talked, John urged me to notice the contrast of his garden plot to the fields of some of his neighbors, whom he called "chemical farmers." He made me smell the moist soil, notice earthworm castings, admire a healthy vine of pepper, and see the botanic diversity all around as he challenged me whether I had noticed the effects that generations of different cash crops have had on the region's landscape. Had I seen banana and areca nut take over wet rice valleys? Was I aware that most dryland fields in Wayanad once featured gigantic trees and that settlers like himself had cleared them? Had I realized that frogs, fish, and crabs had disappeared from most fields in Wayanad?

John explained that he maintained his homestead garden also as a kind of "model farm," a way to inspire hope and demonstrate to his neighbors and friends that mixed horticultural fields can yield a diverse but rich harvest throughout the year without requiring a lot of money and work. He was well aware that the security of his government pension had once allowed him to take the risk and experiment with Fukuoka's "do-nothing farming," a style of farming that minimized human interventions, such as tilling, pruning, or fertilization, and instead nurtured symbiotic relationships between plants and soils. Mr. John also acknowledged that many other settler farmers, many of whom were Syrian Christians like himself, felt that they had no other choice but to enter the treadmills of monoculture, credit, and chemicals that produced Wayanad's landscape of agroecological crisis in the highlands of Kerala. Visiting John's fields, I began to see that an alternative trajectory of settler agriculture would have been possible, and I began to ask whether the contemporary agrarian crisis was the outcome of specific "styles of farming" and the cultivation of particular crops in the postcolonial history of the district.

Following Frontier Plants: Multisited Fieldwork in a Landscape of Crisis

In 2008, the year I stayed on John's farm, Wayanad was infamous as a hot spot of farmer suicides. During my fieldwork, part of my research involved

tracking down families in which suicides had occurred and trying to learn from family members and neighbors about the possible causes of suicide, which I had initially assumed to find in the political economy of small-scale farming in globalizing India (Münster 2012, 2015a; see also Vasavi 2012). This phase of the research led my friend and field assistant Joby and me to farm visits across the district. We had obtained a list of names of 435 "farmers' suicides" that had been officially recognized by the state of Kerala between 1999 and 2007. Visiting the "victim families," as Joby and other nongovernmental organization workers often called them, and conducting semistructured interviews with family, neighbors, and friends, we hoped that recording individual life trajectories would help us make sense of the suicides. My initial research was aimed at understanding the connection between suicide, biopolitics, and precarious livelihoods (Münster 2012, 2015a), but soon my interlocutors reoriented my curiosities to the materialities of farming and to the multispecies history of plants growing in this landscape. As Heather Swanson (2020a, 16) puts it, "in good fieldwork, one must open oneself to the curiosities of others and allow them to alter one's own." In my case, this involved modes of attuning to historicity and the agency of plants in the history of settler migration to Wayanad since 1945.

Following plants and how they were remembered by a variety of people meant that my fieldwork became largely multisited, in the sense that it did not involve deep immersion in a face-to-face community through stationary fieldwork as I had practiced previously in an ethnographic study of a multicaste village in Tamil Nadu (Münster 2007). This time, fieldwork recurred over the span of eight years and covered a district of more than two thousand square kilometers. Settlement patterns in Wayanad were largely dispersed, with individual houses spread out in the landscape, each surrounded by a garden or fields. A typical fieldwork encounter was thus a prearranged visit to a house, with more or less structured conversations about settler histories and successive styles of planting. During these visits, my interlocutors directed my interest to their struggles in appropriating the land on which we were walking and to the role that plants had played in the process of migration and settlement, and later in the boom and bust of cash crop economies. The settler areas are distributed across the district, making the rubber on the tires of my modes of transportation as methodologically important as the rubber below my feet.

It took me a while to recognize the landscape of Wayanad as a frontier in ruins. As I was traveling hundreds of kilometers with my companions by car, on the backs of motorcycles, on local buses, and by foot, hiking to houses in remote parts of the hilly district, my companions taught me to read the cultivated landscape as formed by the political history of migration and the multispecies history of key crops. First, I learned to see the difference between wetlands and drylands—in Malayalam, called *vayal* and *kāra*, respectively. This distinction, which is widespread across Asia (Geertz 1972; Kirch 1994), describes both the landscape and its appropriate plants. Whereas rice was the plant of the *vayal* wetlands, the *kāra* drylands were traditionally used for the mixed cultivation of garden fruits in homestead gardens *(tottam)*, such as the one preserved by Mr. John. Crisscrossing the district collecting stories of how people and plants made places, I learned to see this historical landscape beneath a current reality in which dryland crops were increasingly being cultivated in wetlands for the purpose of fast profits. Focusing on plants helped me to "better 'read' the landscape" (Tsing, Mathews, and Bubandt 2019, S188).

I learned to see how settler plots were different from those of the landowning cultivating castes of Chetties, clustering around paddy wetlands that used to be communally owned. Colonies of Paniya, the Adivasi laborers with hardly any land of their own, were located near the fields of their former Chetty landlords or on marginal lands. The settler houses, in contrast, were more likely to be built on dryland and feature a variety of styles of cash crop farming. I also learned to notice agrarian ruination. When farmers showed me around their fields, I learned from them to notice the material signs of ruination in the fields themselves; former wet rice fields that were now planted with cash crops like ginger or banana and encroached on from the margins by tree plantations of areca nut *(Areca catechu)* or rubber *(Hevea brasiliensis)*. The formerly cool and moist wetlands *(vayal)* now looked dry, hot, and exhausted. I learned to recognize disease-affected former pepper plantations by long rows of *murikku* trees *(Erythrina variegata)*, which used to be planted to support pepper monocultures. I learned to recognize Jeeps with laborers and cultivators leaving for the neighboring state of Karnataka to plant ginger on leased land (Münster 2015b) because the soil in their own villages was contaminated with pathogens.

At some point during my intermittent fieldwork, the focus on suicide cases made way for oral histories of migration and for the study of the historical agency of plants in the process of internal colonization. I continued with farm

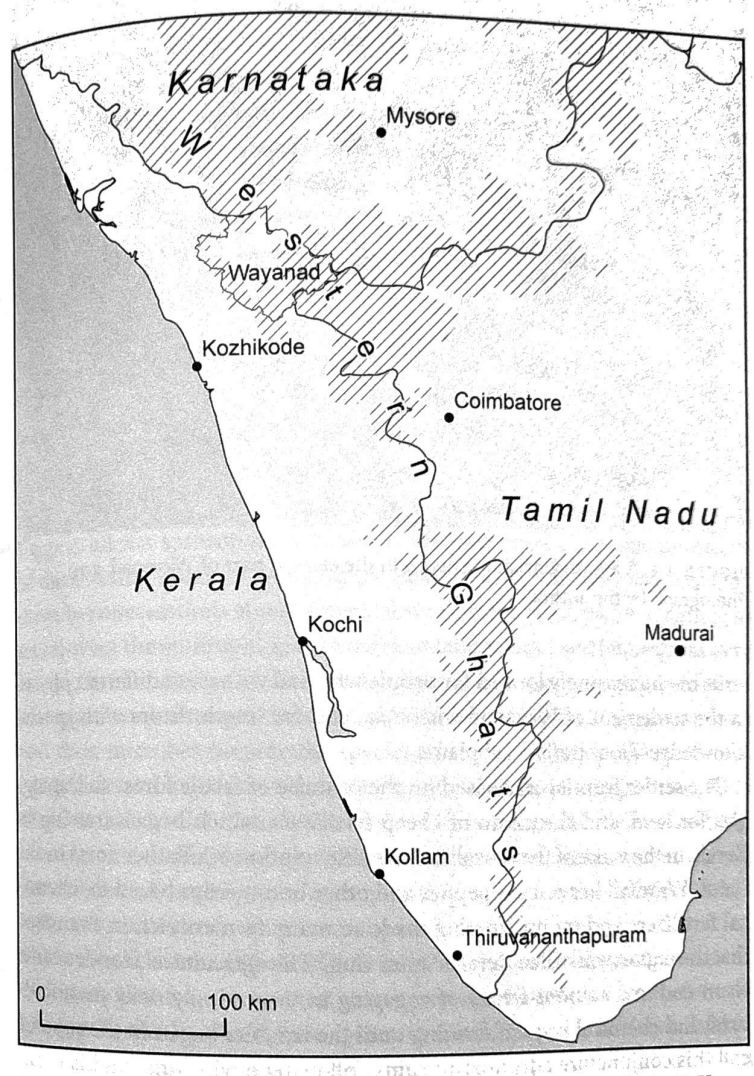


FIGURE 4.1. Location of Wayanad district in South India. Cartography by B. Kraus.



FIGURE 4.2. A Syrian Christian church in the eastern part of Wayanad, 2011. Photograph by the author.

visits but increasingly looked for people who had witnessed different phases in the settlement of Wayanad since 1945 and for interlocutors with special knowledge about individual plants.

The settler frontier was based on the promise of fertile forest soil, struggles for land, and the allure of cheap fertilizers, which began arriving in Kerala in the wake of the so-called Green Revolution (Cullather 2013) in the 1960s. Windfall harvests of pepper and other boom crops based on chemical fertilizers and monocropping made so many farmers rich in the 1980s that the region was called Kerala's "mini Gulf." The agricultural frontier came to an end in a ruinous frenzy of engaging in increasingly risky monocultural and chemical ways of farming until the troubles began in the 1990s. I call this conjuncture a frontier in ruins, following environmental historian Don Worster's work on the American frontier.

In *Dust Bowl*, Worster (2004, 100–106) calls the 1930s agroecological disaster of the Dust Bowl in the American Great Plains a "frontier in ruins" of the

settlers' own making: "The Dust Bowl . . . was the inevitable outcome of a culture that deliberately, self-consciously, set itself the task of dominating and exploiting the land for all it was worth" (4). My work takes inspiration from Worster's focus on how agricultural settler frontiers may end in human-made disaster, fueled by the logics of capital, colonization, and cash crop production. Following two sets of case studies, suicide cases embedded in life histories and plant cases situated in histories of migration, was facilitated by (self-)critical conversations within the settler community itself. I experienced a frontier society caught in a moment of self-reflection. Conversations about the present ecological failure of agriculture and its connection to human tragedy and suicide frequently turned to crop histories gone wrong.

Attuning agricultural anthropology to the "multispecies crisis" of the Anthropocene requires methods that go beyond the study of people's relations to land, labor, and markets by cultivating a curiosity for the plants, animals, and microbes involved in making agrarian landscapes (see the Introduction to this volume). Moving beyond human settler relations to land, I suggest, allows anthropology to more fully recapture the tragic historicity of those settler relations. Walking the fields of settler farmers and engaging them in conversations about historical successions of crops, I was aiming to reconstruct the anthropological history of how cassava and lemongrass were complicit in making the frontier landscape; how pepper, ginger, banana, and agrochemicals coproduced an ecology of suicide; and how native cows and their microbes became the species of symbiotic recuperation of soils. In agriculture, I argue, stories about the natural–cultural composition of the world and about the material basis of cultivation abound. My human interlocutors, first- and second-generation farmer settlers, were acutely aware of the distributed multispecies agency in the making of the frontiers. Boots and roots made the frontier landscape in concert.

My multispecies methodology is inspired by scholarship in environmental history that focuses on frontiers as projects of more-than-human world making. Particular plants have agency in them as frontier cultivars. Rubber (Dove 2011; Peluso 2012), cocoa (Ruf 2001; Li 2002), palm oil (McCarthy and Cramb 2009; Brad et al. 2015), and cardamom (Fitzpatrick 2011) afford their own natural–cultural properties to the ways land grabs and deforestation have been organized at historical frontiers. Forests and mountains become

central figures in resource frontiers or forest frontiers, as are the migrants and companies who grab the resource-rich forests (Tsing 2003, 2004; Peluso and Vandergeest 2011). I thus associate with a strand of multispecies studies that is less preoccupied with novel forms of "immersion" in the lives of nonhuman others by honing the senses toward multispecies "attentiveness" (van Dooren, Kirksey, and Münster 2016). Emergent plant ethnography (Hartigan 2019) has involved playful attempts at interviewing (Hartigan 2017, 259), listening to, and sensing plants (Boke 2019; Myers 2015). I am interested in how plants make historical landscapes, inscribe themselves in the projects of territorialization (Besky and Padwe), and contribute to changing land relations in frontier conjunctures (Li 2014). Instead of tuning in to plants, I turned to my interlocutors' memories of plants to "read histories in material forms" (Swanson 2020b). I turned to farmers as scientists and historians of a frontier in ruins. My approach is aligned with recent anthropological calls for attunement to multispecies landscapes: "The multidimensional crises of our times call for an anthropology . . . that takes landscapes as its starting point and that attunes itself to the structural synchronicities between ecology, capital, and the human and more-than-human histories through which uneven landscapes are made and remade" (Tsing, Mathews, and Bubandt 2019, S186).

For the remainder of this chapter, I sketch the more-than-human history of Wayanad's postcolonial frontier landscape. I hope to show that a historical-anthropological understanding of dramatic changes to the landscapes of the Anthropocene benefits from a double methodological focus on both human and nonhuman agents of change as coproducing a frontier in ruins as well as the potential for repair. I focus on the role of plants, chemicals, and animals in the internal colonization of this agrarian hinterland since the end of the Second World War.

Internal Colonization of Malabar (circa 1945–1975)

Agrarian frontiers are sites of more-than-human encounters. Calling Wayanad a settler frontier invites uneasy questions about nativity and belonging—human and nonhuman. Newcomers, settlers, and pioneers bring their own cultivars, chemicals, and aesthetics to encounter people, plants, and wildlife embedded in landscapes and ecologies. "Native" landowning Hindu castes and Adivasis of Wayanad (who had at some point in history also

migrated there) used a variety of terms for these cultivating newcomers. *Kuṭiyēṟṟakkar* is the common term and means both "migrants" and "settlers," two English terms also frequently used. In official publications, the settlers are often referred to as "colonisers from Travancore" (e.g., Devassy 1966, 181). Despite the large numbers of Hindus among the settlers, settlers are also frequently called *kristyāni,* which means "Christians." The agrarian frontier I describe here is a postcolonial frontier, from the perspective of mostly second-generation Christian settlers. The Syrian Christians of Kerala comprise several different denominations that follow the Syrian liturgy due to their historical ecclesiastic orientation to the Patriarchate of Antioch and claim to be able to trace their origin to conversions made by the Apostle Thomas when he, according to legend, evangelized in India in the first century A.D. The (then) princely state of Travancore, which merged with Malabar and Cochin to form Kerala state in 1956, is the historical heartland of Kerala's autochthonous Christians. A combination of need and opportunity initiated a land rush by Christians from Travancore to Malabar (including Wayanad) from approximately 1945 to 1975. Poverty, food shortages, and political tensions with an increasingly Hindu majoritarian state in Travancore (Devika and Varghese 2011) "pushed" this relatively well-educated and entrepreneurial community to seek the opportunity for cheap land that opened up after the end of British colonial rule. In Malabar, which was under "direct" rule, the colonialists had given land titles to large feudal land claims (called *janmam*). These extensive lands, often forested, attracted the peasant settlers, who were given land by the state, bought cheap plots from absentee landlords and temples, or encroached on land with future promises of land reforms in mind.

When the migration of agricultural settlers coincides with the expansion of state control (with the formation of Kerala) or development plans to expand agriculture, it may be justified to call the migration to the frontier zone a form of "internal colonialism" with far-reaching consequences for entire landscapes. As Scott (2009, 12) puts it, internal colonialism

> involved a botanical colonization in which the landscape was transformed—by deforestation, drainage, irrigation, and levees—to accommodate crops, settlement patterns, and systems of administration familiar to the state and to the colonists.

In contrast to Scott's Southeast Asian cases, however, Wayanad's internal colonization had less of a planned, state-led character. Rather, it was made up of a multitude of individual efforts in grabbing land, mostly through legal means but also through encroachments, but always with the help of pioneer crops. The remainder of this chapter describes the contribution of more-than-human species to making the frontier. Settlers brought tapioca, coconut palm, areca nuts, and improved varieties of pepper alongside new chemical species, such as dichloro-diphenyl-trichloroethane, better known as DDT, an insecticide that opened the landscape by killing mosquitoes during the large-scale malaria eradication campaigns. Later, during the era of the Green Revolution, new chemical inputs arrived, such as mineral fertilizers and pesticides, along with more improved varieties of high-value cultivars, such as pepper. I then turn to pepper and ginger as neoliberal crops that materially shaped the spate of suicides that had become emblematic of Wayanad's agricultural crisis since the 1990s.

Frontier Crops: Cassava and Lemongrass Aid Internal Colonization

In Wayanad, two plants, cassava and lemongrass, can be regarded as frontier plants during the land rush from 1945 to 1975. Their qualities made them an excellent means of taking land and accumulating money in the initial stages of the settler frontier, when land tenure was insecure and the needs of subsistence slowly faded into the desire for accumulation. To put it into a simple formula, the frontier had one plant to feed the settlers and another plant to eat the forest. Both crops were "agents of deforestation," as Ruf (2001) puts it. The two cultigens also share an essential property: they both begin to yield after a few months. Cassava and lemongrass lived to their full potential in a situation of insecure land tenures and forceful appropriation of forest land by the settlers.

Manihot esculenta is known in Wayanad as tapioca and *kappa* and to agronomists by the name cassava. The plant, native to tropical South America (where it is known as manioc and yucca), was introduced as a food crop to Goa and the coast of Kerala by Portuguese settlers in the sixteenth century (Lebot 2009, 8). In contemporary India, the starchy root is not very popular as a vegetable, since rice and wheat dominate as sources of carbohydrates

and carriers of flavor. People eat cassava only in the states of Andhra Pradesh and Kerala, where it is perhaps most accepted as a staple food crop and cash crop and only since the 1850s (Crosby 2003, 193). In the rest of India, as in most of the world food system, cassava has become an industrial crop and raw material for the extraction of tapioca starch and its derivatives (e.g., sago) for further industrial use in processed foods, in textiles, or in the manufacture of bioplastics (Edison 2001).

The special relationship of Kerala and tapioca was consolidated in the late nineteenth century in the princely state of Travancore. After the Great Famine of 1876–78, which devastated all of South India (see Davis 2001, 25–59), the government of Travancore promoted tapioca as a new diet staple for the poor by exempting it from taxation (Joseph 1986, 98). The first wave of migrants, those who migrated during the late colonial period, knew tapioca as a famine crop. In Travancore, they had learned to eat and cultivate the tuber, which arguably protected Travancore from major famines up until the Second World War, when India's food production was diverted to feed British Indian troops in their war against the Japanese. Some settler families with whom I spoke remembered that it was hunger and food shortages in the 1940s that drove them to relocate to the available lands of Wayanad, with the intention of cultivating tapioca for subsistence.

Regardless of whether the primary motive of settler migration was subsistence cropping or cash cropping, alongside dryland paddy, the first plant they tended to cultivate was cassava *(kappa)*. Elders in the community remembered how it could be intercropped and made part of a forest garden with yams, pepper, ginger, lemongrass, trees, and coffee as companion plants, or it could be monocropped, harvested, and sold for a high price during famine years. During the 1940s, tapioca was also a high-value cash crop and opened up the possibility of personal accumulation. Cassava was instrumental both in feeding the first wave of migrants and in raising the cash for their further expansion on leased, purchased, or encroached lands. Cassava was also the ideal plant for insecure land tenures. Prior to the land tribunals of the 1970s, most settlers were cultivating land with very insecure lease agreements and land that often was contested as belonging to a temple or the Forest Department. The South American plant, which was fast and easy growing, without any natural enemies, thrived on encroachments onto recently cleared forestland.

Cassava is widely used in tropical shifting cultivation systems across the world. James Scott (2009, 24) includes it under crops suited for what he calls "escape agriculture" or "forms of cultivation designed to thwart state appropriation." These include technologies (such as swidden agriculture) and crop choices (such as tubers) practiced historically by communities evading or escaping appropriation by state authority:

> They preferred to plant root crops (for example, manioc/cassava, yams, and sweet potatoes), which were unobtrusive and could be left in the ground to be harvested at leisure. Depending on how secure the site was, they might plant more permanent crops, such as bananas, plantains, dry rice, maize, groundnuts, squash, and vegetables, but such crops could more easily be seized or destroyed. (Scott 2009, 190)

As the case of Wayanad shows, however, the same crops that have a high "escape value" (Scott 2009, 199) are also useful for the appropriation of new lands at the frontier—and for many of the same reasons. Cassava was the ideal frontier crop because it was very forgiving in its cultivation: it could be planted at any time of the year—whenever a new stretch of forest had been cleared by cutting or burning—and would bear tubers six months after planting without much attention or care needed; it could handle a variety of soils but thrived on former forest land; it could be vegetatively propagated, making it easy to multiply by using cuttings from existing plants; and it was less attractive to the wild animals of the forest. In his praise of cassava, James Scott writes, "Perhaps the most striking advantage of cassava, however, is its undisputed status as the crop requiring the least labor for the greatest return" (206). Agronomists claim that cassava has about the highest return of calories per hectare, which makes it also an ideal subsistence crop for intercropping with other cultivars (Leihner 2002). Cassava's harvest is also quite flexible. Although the roots degrade quickly after harvest, once mature, they can be kept in the soil for up to two years as storage roots for perennial plants, and the settlers can harvest them as needed. Once harvested, the plant is also easily preserved by boiling and drying. Dried cassava, locally known as *kothu kappa,* was also a nonfood merchandise in high demand in the textile industry as a source of starch (Mathew 2011).

Given these qualities, cassava quickly spread in the fresh clearings of the forested dry lands *(kāra bhūmi),* occupied by the settlers from Travancore. It made the settlers independent of paddy production in the wetlands *(vayal),* which continued to be largely controlled by the indigenous Hindu castes. According to some accounts, incoming migrants planted tapioca before they even built their first houses of bamboo mats *(tital)* and mud. But tapioca and other tubers attracted the Indian wild boar *(Sus scrofa cristatus)* that lived in the forest. Some settlers soon figured out that planting bitter cassava, locally called *kannan kappa,* had the great advantage that wild boars did not like it. The raw tuber is poisonous and only edible after soaking in water and boiling. After the settlers had reduced the forest cover further and controlled the wild boar population through poaching, they shifted to normal—sweet—tapioca.

Cassava was the essential food crop of the pioneering settlers at the forest frontier. It grew quickly and abundantly in Wayanad and provided plenty of carbohydrates to hungry newcomers. *Kappa* stew became the staple food of rural workers and is to this date the signature dish of Christian identity. It was served twice a day in the fields to workers and cultivators alike. Older settlers remember how the tapioca they had introduced helped settlers and Adivasis survive the food shortages during and after the Second World War. Contemporary Christian settlers consider tapioca a typical delicacy of their community and prefer to eat it cooked as a sticky, starchy stew, prepared with all kinds of meat. As a frontier crop, cassava was a plant of shifting cultivation that helped people stay in one place.

What made cassava the ideal crop for the appropriation of the frontier wildness was its versatility, sturdiness, and ease of cultivation. Like corn, it has a dual identity, "as food and commodity" (Pollan 2006, 26). This dual identity as a nonfood commodity that could also be eaten made it an ideal plant of reckless arrival. The plant does not take sides in the moral-historical question that came up in most of my conversations, of whether settlers came out of need or out of greed. Cassava itself, quite "greedy" for the nutrients of freshly opened forest soils, was happy to offer its starchy tubers to anyone who cared to propagate it. Spreading onto fertile soils that have been built up over millennia, cassava enabled the smallholder frontier by providing quick food and quick cash. It was not the only frontier crop. Other plants, such as

lemongrass, also followed the settlers' migration and made their way into Wayanad's ecologies. Lemongrass has inscribed itself into the contemporary landscape by being an agent of deforestation and commercialization.

Lemongrass was the first nonfood cash crop on the land of the settler migrants. In contrast to cassava, lemongrass was exclusively a commercial plant. The olfactory qualities of lemongrass—its characteristic lemony smell—allowed for the addition of value through distillation. With its value concentrated in its aromatic oil, the plant was ideal for capital accumulation in faraway places. Moreover, its cultivation had the beneficial side effect of requiring large quantities of firewood for the extraction of its oils, making lemongrass the ideal crop for settlers who wanted to get rid of the trees, bamboos, and bushes that covered the landscape. In conversations in eastern Wayanad, where land appropriation was most messy and violent, I heard of an additional advantage of lemongrass cultivation in the context of legal and political struggles for land. In the context of imminent land reforms in Kerala that promised occupied land "to the tiller" but also assigned forested land to the Kerala Forest Department, encroachers were eager to show that they were cultivating their plots and that the land was indeed cultivated. It was thus important to rapidly "clear" the landscape of forest shrubs. In the years of legal uncertainty, fields of lemongrass gave the landscape a cultivated look, biophysically marking it as occupied ground.

Several varieties of lemongrass, now grown throughout the tropics, are native to Asia. In Wayanad, cultivators grew the so-called Malabar grass or Cochin grass *(Cymbopogon flexuosus)*. This variety is native to the Western Ghats and known under the trade name East Indian lemongrass. It is a perennial plant that accumulates essential oils in the leaf blade. After two to five months of cultivation, the leaves can be harvested and processed for the first time. Subsequently, the plant will yield two to five times a year for several years, providing a steady income to cultivators.

Lemongrass was a perfect successor for cassava, as it has the ability to grow even on soils that have lost fertility after the cultivation of cassava. The most important feature of lemongrass, however, was that it meshed so well with the settlers' desire to clear the forest and mark it as occupied. A recurrent theme in my conversation with first-generation settlers comprised expressions of negative emotion toward the forest. Older settlers talked about the forest in "those days" as cold, misty, overwhelming, and dangerous. Many

spoke of forests in the 1950s and 1960s not only as potential land for settlement but also as a threatening "jungle" hosting dangerous wildlife, malaria, and a harsh climate. Lemongrass served them as a means and justification for the removal of trees. Lemongrass flourishes in full exposure to the tropical sun and can withstand its heat. It does not like the shade provided by forest trees. Thus its yield increased in direct correlation to the disappearance of the forest. Burning forest trees was technically illegal, or at least highly regulated, depending on the type of land. However, as one elderly migrant put it, "[in the 1950s,] the Forest Department was not yet organized." Lemongrass cultivation codeveloped also with the emergent pattern of turning forest not only into food but also into profit. The excess wood and shrubs cleared from Wayanad's dry deciduous forests fueled lemongrass distillation units in need of cheap energy.

As a commercial pioneer crop, lemongrass was ideal because its value could be increased by distilling the essential oils in situ. Its scented oil is known by the international trade term Cochin oil, as the port of Cochin (Ernakulam) is the main export hub. Like cassava, lemongrass has a close association with Kerala. The state holds the monopoly of its production in India; one-fourth of the global crop is distilled there. In 1951, Kerala Agriculture University established the first research station for aromatic and medicinal plants, commonly known as the "lemongrass research station" (Joy et al. 2006). For many frontier settlers, the flip side of lemongrass production was that they were reducing the growing of food in their fields and (retrospectively speaking) were embarking on a path of speculative commercialization that decades later culminated in a suicide crisis. Unlike cassava cultivation, which was simultaneously a subsistence crop and produced for the market, lemongrass was only for the market. This was not the frontier of hungry peasants fighting starvation; it was the frontier of rural entrepreneurs. Lemongrass cultivation needed markets—in this case, the global export markets that had been established by colonialism. With lemongrass, the frontier showed its face as a frontier of accumulation: frontier farming became synonymous with cash cropping.

Transporting high-value oil, as opposed to bulk material and heavy cassava tubers, was also much easier at the remote frontier. Settlers could easily produce lemongrass oil via a process called "steam distillation" (Skaria et al. 2012, 361), in which steam passes through the grass blades, collecting the oil—

with heat gained by burning (smaller) trees and shrubs farmers had cleared from their fields. Cooling the steam in a copper vessel separated the water from the aromatic oil. Lemongrass highlighted differences in class and skill among the settlers. One of my interlocutors pointed out to me that only wealthier settlers could afford such a field distillation unit: "Those who had some money built a distillation plant. Wood was not a problem at the time. Those who had the units had the customers. The leftovers from the distillation process were good manure for the paddy fields."

Lemongrass was the pioneer's cash crop of choice, but its cultivation was not sustainable at all. Cassava and lemongrass profited from what scholars of tropical agriculture call the "forest rent" (Ruf 2001; Li 2002; Hall 2011), which is the additional fertility afforded by recently cleared forest. It is a "cheap" fertility, in Jason Moore's sense, as it can be extracted without the work of soil care. The forest rent seems indispensable for "insecure crop booms" (Hall 2011). Lemongrass produced the first "get-rich-quick stories" (Hall 2011) at the frontier and thereby attracted further migration, and it helped to visually mark a plot of landscape as "under cultivation," which was important for land claims. They were the first smallholder boom crops and initiated the cycles of rural booms and busts that had ruined the frontier by the time of my fieldwork. Colonizing the land with these pioneer crops created the landscape conditions and economic logic for the boom crops directly associated with farmer suicides.

Species of Boom and Bust: Pepper, Ginger, Banana, and Agrochemicals Make Riches and Suicides

In this section I turn to agrarian species that are visibly inscribed into the contemporary landscape. They all featured prominently in the collective endeavors of making sense of what went wrong in Wayanad, conversations into which it tapped when studying suicides. Multispecies history is the history of advancing commercialization of specific plants. The commercialization of agriculture in Wayanad intensified once property titles were granted to most of the settlers in the long process of land reform in the 1970s. It was further supported by the arrival of chemical fertilizers and pesticides. Even after Wayanad closed (or slowed down) as a frontier of land grabs, its agriculture continued to be informed by the logic of crop booms and their tragic busts. However, the dynamic shifted from an insecure boom, characterized by legal, political, and economic uncertainty, to a succession of agricultural booms and busts based on secure land tenure and new crops.

Pepper: The Vine of Settlers Who Strike It Rich

Piper nigrum, black pepper, *kurumuḷaku* in Malayalam, is native to Wayanad and the Malabar Coast. Malabar has a long history of trade with the world (Morrison 2002), and its black pepper is considered to be the best in the world. In global commodity trade, the highest-quality black pepper, the one with the largest drupes, is called "Tellicherry Garbled Extra Bold" after the trading town of Thalassery in Kannur. Despite this long-standing biological and economic connection to Wayanad, contemporary pepper is primarily a plant of the settler frontier. The settlers first introduced the new hybrid cuttings that had been developed at the Pepper Research Station in Panniyur (Kannur district) from 1952 onward. Accordingly, these commercial hybrid varieties of pepper were called Panniyur-1 to Panniyur-5 and were the protagonists of the pepper boom of the 1980s, along with a number of other varieties, such as Karimunda, Kottanadan, Narayakodi, and Sreekara. Today, India is the largest producer of black pepper in the world, and Kerala produces some 90 percent of all Indian pepper.

In the 1970s, many settlers started pepper cultivation. This was a substantial shift in the temporality of cultivation. Whereas lemongrass needed only forty-five days before it could be harvested and processed, pepper vines didn't begin yielding until three years after planting, reaching their maximum after seven years, but they can then yield for up to twenty-five years. This changed the temporal horizon of planning considerably. Pepper is vegetatively reproduced and requires timely planting of the cuttings just before the monsoon begins (Ilyas 1976). Throughout its life-span, pepper then requires the constant care of pruning, hoeing, weeding, and fertilizing by the cultivator/gardener. By the mid-1970s, settlers had the first harvests of pepper. In the 1980s, the plants continued to produce bountifully and now combined with great prices for pepper, so that it became known as black gold. The pepper boom ended only a decade later with a near-total loss of pepper and many livelihoods. During the boom years, pepper fundamentally transformed homestead agriculture.

Initially, most settlers had cultivated pepper in combination with coffee as part of mixed homestead gardening. Pepper was a key species in these flourishing gardens that many settler families had established around their houses. Such home gardens used to be widespread in the midlands of Travancore, where the hills have plenty of dryland *(kāra)* and fewer wet-rice flats *(vayal)*. Individual houses were in the center of these dryland gardens, which had qualities of both field and forest. When settlers reproduced that model, Wayanad's version of agroforestry featured combinations of trees (old forest trees and newly introduced coconut and areca nut palms), bushes (coffee), and, at the lowest level, annual crops of tubers (cassava, yam, elephant foot yams, colocasia), rhizomes, vegetables, and grasses. Pepper grew there symbiotically and flourished, just as it continued to do on Mr. John's farm in 2008. With the high prices of the 1980s, however, many farmers wanted to cultivate nothing but pepper and began remodeling their land in favor of pepper monocultures. In light of the boom in pepper, many settlers with whom I spoke recalled perceiving coffee and other longer-living plants as a burden for their plots, as they wanted to produce only more of the "black gold."

The shift to monocropping was not subtle. An older settler described with horror the removal of coffee bushes. His neighbor had hired a *kumkhi* work elephant and an elephant handler, put large metal chains around the grown coffee bushes, and literally ripped them out of the ground. The next casualties were the existing trees that supported pepper, some of which were remains of the erstwhile forest and others of which were planted for fruit and flowers. As a perennial evergreen plant, the woody (herbaceous) vines of *P. nigrum* require trees to support them for many years. Pepper vines are attached by aerial roots to the supporting tree, but they are not parasitic on the tree, and both the trees and the pepper provide welcome shade and moisture to the rest of the garden. Settlers, however, were unhappy with the sparsely and randomly placed support trees in their fields. Many thus felled or burned the last of the old forest trees. After clearing the dryland of perennials and forest trees, many settlers planted rows of fast-growing *murikku (E. variegata)* trees, and some even installed cemented poles on their fields.

One settler described the changes thus: "After 1980 all the agricultural area was converted from food [*bhakṣa*] to money crops [*nāṇya viḷa*]. Someone identified the soil as ideal for pepper; slowly everything became a monocrop. Even on small patches." In 1986, the price of pepper rose dramatically, generating "a large amount of money-vehicles, houses, *paisa* [money]."

The unexpected and sudden wealth generated by pepper made farming a very attractive occupation and, in contrast to the trend in agricultural India, a very lucrative one as well. Wayanad became prosperous and began to attract large numbers of migrant laborers from Tamil Nadu. But even as agriculture in Wayanad was becoming lucrative, it was also becoming speculative and risky. On dryland *(kārasthalaṃ)*, farmers who had both a homestead garden and dryland crops began monocropping closer to home at the expense of their previously diversified gardens. First it was pepper, then whichever crop was promising the highest returns or the lowest labor costs. Many poor settlers with little land of their own extended cultivation on leased land, often on the basis of loans with horrendous interest rates from cooperative banks, private banks, and moneylenders (see Münster 2012).

The pepper boom owed its success not only to the settlers' enterprising spirit and the invention of pepper monoculture but also to the "cheap" fertility afforded by the forest soils and the newly arriving synthetic fertilizers.

AGROCHEMICALS: NPK AND PESTICIDES ENABLE MONOCULTURE

In the 1980s, new chemical species of mineral fertilizers and synthetic pesticides entered Wayanad on a large scale, supported by agricultural subsidies and the recommendations of agricultural extension officers, who were trained in the new agronomic paradigm of the so-called Green Revolution. This large-scale modernization program, driven by U.S. interests, replaced traditional agricultures with "scientific" methods on the basis of hybrid seeds, irrigation, and agrochemicals across the Global South. In Wayanad, synthetic nitrogen-phosphorous-potassium (NPK) fertilizers, called *rāsa vaḷaṃ* (chemical fertilizers) in Malayalam, gave an additional boost to the new methods of pepper monocropping developed by settlers in conjunction with local research stations. After the forest rent, farmers now benefited from what might be called the "chemical rent." The chemical rent is that initial boost in productivity and profit provided by the chemical enhancement of soils and plants. The additional yield is the main "temptation of nitrogen" (Müller 2012), which lasts until the long-term side effects of NPK use show in the fields and the true costs of artificial fertilizer are revealed. A farmer

explained the fertilizer treadmill like this: "In the beginning, if someone is applying hormones and chemicals it will look nice and give a nice price in the market. Now the fertilizers are more important because the land has lost its fertility."

As is well documented in the literature, excessive nitrogen fertilization depleted the soil by disrupting microbial soil activity, which is responsible for replenishing soil with organic carbon. Ecologists speak of the "silent hunger of the soil" (Environmental Governance Group 2011, 15) that occurs when micronutrients—as opposed to the NPK macronutrients—are mined from the soil, if they are not replenished by microbial activity. Mineral fertilizers also raise the pH level in the soil, making it more acidic, which changes the soil's bacterial milieu. Excess nitrogen fertility increases soilborne diseases and fosters the outbreak of insect pests. Nitrogen and phosphorous also have consequences beyond the field, as they "cascade" (Billen, Garnier, and Lassaletta 2013) from field to field and accumulate in oceans and the atmosphere, disrupting the "biochemical flows" of planetary nitrogen and phosphorous cycles that connect all life (Steffen et al. 2015).

Chemical biocides—the entire spectrum of pesticides, herbicides, and fungicides—arrived a few years after NPK fertilizers but were soon adopted with the same indiscriminate and boom-oriented attitude. Before long, the use of biocides took on catastrophic proportions. In contrast to fertilizers, they are freely traded on the market. Today, when Wayanad's settler farmers look back at the 1980s and 1990s, they describe their own attitude of the time as a mixture of greed and ignorance:

> People applied tons of toxic pesticides [*kīṭanāśini*] in Pulpally. In our region it was more, because everyone wanted to be part of the boom. The fertilizer traders brought a lot of fake and banned products from other states. The government encouraged us to use chemicals but provided no checks on private sale.

Not everyone agreed with these new styles of farming, which people began calling *rāsa krsi*—"chemical farming." Especially among the native cultivating castes of Wayanad, I heard many remarks that *rāsa krsi* was the way of the *kuṭiyēṟṟakkar*, the migrants, only, and that the Christians had introduced these "harsh" ways of farming.

Most settlers in eastern Wayanad have stories to tell about how their fortunes shifted dramatically when pepper suddenly disappeared. Beginning in the early 1990s, farmers lost almost all their pepper to *Phytophthora capsici*. Phytophthora, which literally means "destroyer of plants," is a water mold (oomycote) that causes symptoms in pepper locally known as quick wilt or foot rot. The water-loving mold infects soils and plants during the monsoon season and begins to show as black spots on the leaves and by turning the tender runner shoots black. Within a month, the disease spreads to the entire plant, causing it to yellow, wilt, lose all its leaves, and ultimately dry up. In Wayanad, quick wilt lived up to its name and rapidly destroyed entire landscapes of pepper gardens.

One farmer who lost all his pepper in 1995 retrospectively regretted that despite the terminal crisis in pepper, "people did not go back to food cultivation but tried the next cash crop." Rather than being viewed as a cautionary tale, the pepper crisis signaled the beginning of speculative agriculture and the suicide crisis. The logic of boom and bust went on to repeat itself with other crops (vanilla, banana, ginger). In this way, the decline of pepper marks the beginning of the socioecological crisis that has since characterized Wayanad. Instead of returning to mixed cultivation, most settlers were forced to engage in the next hype in the hope of making up for past losses. In the next section, I turn to the two crops my interlocutors associated most directly with farmer suicides: banana and ginger.

Banana and Ginger: Rhizomes of Speculation

Ginger and banana had both been cultivated in South India long before the arrival of colonialism and capitalism. Ginger, or *Zingiber officinale* (from the Tamil *iñciver*), is endemic to the Western Ghats and is, together with pepper, among the earliest recorded spices to be cultivated and exported from southwest India (Ravindran and Babu 2005). Despite this long-established plant relationship, the cultivation of ginger has changed considerably, first with internal colonization, then in response to agricultural crisis. Settlers brought ginger rhizomes along with other new cultivars, such as tapioca, lemongrass, and other pioneer crops, when they migrated to the region. Ginger was valued for being hardy and fast growing. It could be planted in between trees and other shrubby cultivars, such as coffee, and it was suitable

for recently cleared forest soils and as an addition to mixed gardens. Later, when the settlers established homestead agriculture, they grew it on the fringes of fields or in small rows alongside other plants, primarily for household consumption.

The genus *Musa*, commonly known as banana, has also been cultivated for millennia in South India. Among the settlers of the 1970s, banana was a crop of the home garden in the "planting continuum," to be planted in single shoots near the houses. The planting continuum refers to a gendered spatial division featuring home gardens closer to the houses and wet-rice paddy fields and cash crop cultivation farther away. In many settler families, women cared more for gardens closer to home, while outside cash crops were an exclusively male domain.

With the crisis of pepper, both ginger and banana moved from the female space of the home garden to the male-dominated sphere of the plantation. In this shift, these plants—its "improved" varieties—were forced into monocultures and speculative economies and were subjected to large amounts of agrochemicals. In monocultures, both ginger and banana are prone to failure. A strong wind, untimely rain, or pathogens, such as the soilborne soft rot afflicting ginger or the pseudostem borer *Odoiporus longicollis* affecting banana, can destroy entire fields within days. Compared to pepper, which takes years of commitment, the temporality of ginger and banana as annual crops makes them quintessentially speculative crops. A single season can make a cultivator rich or go bankrupt. Many farmers who had lost pepper started cultivating ginger and banana based on loans at cutthroat rates. Often cultivated on leased land, typically on converted paddy wetlands, these plants had the sole purpose of making a lot of money in a single season. They became high-stakes crops that played a foundational role in the crisis economy of Wayanad (Münster 2015b). These high stakes, in turn, led many cultivators into using excessive amounts of chemical fertilizers and pesticides. In the process, banana and ginger became infamously toxic plants. During fieldwork, I was often offered bananas with the reassurance that these were grown in the "kitchen garden" and without pesticides, so widespread was the recognition that commercially produced bananas are too toxic to be safe to eat. In particular, the pesticide Furadan (carbofuran) became a common poison in many households, kept for its importance in controlling the pseudostem borer. With Furadan, my research on frontier plants was brought

full circle. Furadan was also by far the most common means of committing suicide. And the short-term cultivation of banana and ginger, particularly on the basis of credit and on leased land, was by far the most common immediate reason given to me for farmers' suicides.

CONCLUSION: LANDSCAPE, LAND, SOIL

A multispecies perspective on anthropological histories of the Anthropocene offers a deeper understanding of agricultural frontier dynamics that have transformed large parts of the tropical Global South into plantations at the expense of forests and indigenous agriculture. A focus on plants and other nonhuman species allows us a fresh perspective on the materiality and temporality of the making and unmaking of an agricultural frontier. The contemporary unmaking of Wayanad's agrarian frontier is marked, among other manifestations, by tragic occurrences of smallholders faced with debt and failing crops committing suicide. Critical descriptions of landscape histories from a multispecies perspective provide an ecological, more-than-human explanation for agricultural crisis. A methodological focus on plants and their properties reveals their agency in shaping the history of migration, welcoming Green Revolution chemicals, structuring market forces, shaping Christian settler culture, and driving smallholders to speculation and ruin. Thinking with plants also helped me understand and "attune" to the way agrarian crisis is inscribed onto the landscape. The material-semiotic qualities of domesticated plants offer an understanding of the "structural synchronicities between ecology, capital, and the human and more-than-human histories" (Tsing, Mathews, and Bubandt 2019, S186) that political-economic analysis alone would not achieve. Remembering migration and individual histories of settling in Wayanad puts the role of plants center stage. My attempt at understanding the suicide crisis of the ethnographic present tapped into ongoing discussions of what had gone wrong. Looking back, my interlocutors correlated specific plants with specific phases in the ongoing drama of frontier making, boom, and crash.

The pioneer plants cassava and lemongrass thrived in the temporalities of insecure land relations and were complicit in feeding encroachers, clearing forest, and creating a landscape for extractivist farming. Agrarian cultivars enabled the grabbing of land, the transformation of forest into

dry land, and the commercialization of small-scale agriculture. Internal colonization, much as the larger projects of empire (Anderson 2004), is a multispecies process. Pepper was an unlikely candidate for initiating an agrarian boom and bust. It was a plant of the region, ideally adapted to climate, soils, and plants and flourishing in multispecies gardens. During the 1980s, however, it lured farmers into experiments with monocropping. When cultivated as a monocrop, and being fed only synthetic food, pepper falls prey to slime molds and, in the process, coproduces a scene of agrarian crisis, including the first instances of ruined farmers' suicides. With ginger and banana, forced into monocultures and kept alive with pesticides, we encounter the plants and chemical species behind farmer suicides, whose stories are too often told in reductionist terms as a failure of the state or of globalization. "Ginger is a killer" some in Wayanad say. However, the specularization of agriculture has been produced with and through plants and their people.

As colonialism and capitalism transform multispecies landscapes into territory, property, and resource, specific plants at specific times move center stage. While a majority of settler farmers continue to chase ever-elusive profits from cash crops or the sale of land, a small but vocal group of farmers are committing themselves to exploring symbiotic agriculture based on novel understandings of microbial ecology and traditional techniques (Münster 2021). The multispecies engagements of agonistic farmers who practice natural farming as an ethicopolitical counterpoint to chemical farming force us to acknowledge an alternative world in which lively soil is connected to the rest of life via invisible and largely unknown microbial relations. In anthropological storytelling, especially of the hopeful kind, it matters how we conceive of how the well-being of people and other beings is entangled with landscape, land, or soil.

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References

Anderson, Virginia DeJohn. 2004. *Creatures of Empire: How Domestic Animals Transformed Early America.* Oxford: Oxford University Press.

Billen, Gilles, Josette Garnier, and Luis Lassaletta. 2013. "The Nitrogen Cascade from Agricultural Soils to the Sea: Modelling Nitrogen Transfers at Regional Watershed and Global Scales." *Philosophical Transactions of the Royal Society: Biological Sciences* 368, no. 1621: 1–13.

Boke, Charis. 2019. "Plant Listening: How North American Herbalists Learn to Pay Attention to Plants." *Anthropology Today* 35, no. 2: 23–27.

Brad, Alina, Anke Schaffartzik, Melanie Pichler, and Christina Plank. 2015. "Contested Territorialization and Biophysical Expansion of Oil Palm Plantations in Indonesia." *Geoforum* 64: 100–111.

Carson, Rachel. 1962. *Silent Spring.* Boston: Houghton Mifflin.

Crosby, Alfred W. 2003. *The Columbian Exchange: Biological and Cultural Consequences of 1492.* Westport, Conn.: Praeger.

Cullather, Nick. 2013. *The Hungry World: America's Cold War Battle against Poverty in Asia.* Cambridge, Mass.: Harvard University Press.

Davis, Mike. 2001. *Late Victorian Holocausts: El Niño Famines and the Making of the Third World.* London: Verso.

Devassy, M. K. 1966. *Village Survey Monographs Cannanore and Kozhikode Districts: Census of India 1961,* vol. 7, *Kerala, Part VI A.* Trivandrum: Government of India.

Devika, Jayakumari, and V. J. Varghese. 2011. "To Survive or to Flourish? Minority Rights and Syrian Christian Community Assertions in Twentieth-Century Travancore/Kerala." *History and Sociology of South Asia* 5, no. 2: 103–28.

Dove, Michael. 2011. *The Banana Tree at the Gate: A History of Marginal Peoples and Global Markets in Borneo.* Yale Agrarian Studies. New Haven, Conn.: Yale University Press.

Edison, S. 2001. "Present Situation of Future Potential of Cassava in India." In *Cassava's Potential in Asia in the 21st Century: Proceedings of the Sixth Regional Workshop, Held in Ho Chi Minh City, Vietnam, Feb 21–25, 2000,* edited by Reinhardt H. Howeler and Swee L. Tan, 61–70. Rome: CIAT.

Environmental Governance Group. 2011. "Lives, Livelihoods, and Environment of Wayanad: A Preliminary Study." Bangalore.

Fitzpatrick, Ian Carlos. 2011. *Cardamom and Class: A Limbu Village and Its Extensions in East Nepal.* Cinnabaris Series of Oriental Studies 4. Kathmandu: Vajra.

Fukuoka, Masanobu. 2009. *The One-Straw Revolution: An Introduction to Natural Farming.* New York: New York Review of Books.

Geertz, Clifford. 1972. "The Wet and the Dry: Traditional Irrigation in Bali and Morocco." *Human Ecology* 1, no. 1: 23–39.

Hall, Derek. 2011. "Land Grabs, Land Control, and Southeast Asian Crop Booms." *Journal of Peasant Studies* 38, no. 4: 837–57.

Hartigan, John. 2017. *Care of the Species: Races of Corn and the Science of Plant Biodiversity.* Minneapolis: University of Minnesota Press.

Hartigan, John. 2019. "Plants as Ethnographic Subjects." *Anthropology Today* 35, no. 2: 1–2.

Ilyas, Muhammad. 1976. "Spices in India." *Economic Botany* 30: 273–80.

Joseph, K. V. 1986. "Migration and Economic Development of Kerala." PhD thesis, University of Kerala, Trivandrum.

Joy, P. P., Baby P. Skaria, Samuel Mathew, Ancy Joseph, and P. P. Sreevidya. 2006. "Lemongrass." Odakkali: Aromatic and Medicinal Plants Research Station.

Kirch, Patrick Vinton. 1994. *The Wet and the Dry: Irrigation and Agricultural Intensification in Polynesia.* Chicago: University of Chicago Press.

Lebot, Vincent. 2009. *Tropical Root and Tuber Crops: Cassava, Sweet Potato, Yams and Aroids.* Crop Production Science in Horticulture 17. Wallingford, U.K.: CABI.

Leihner, Dietrich. 2002. "Agronomy and Cropping Systems." In *Cassava Biology, Production, and Utilization,* edited by R. J. Hillocks, J. M. Thresh, and Anthony Bellotti, 91–113. Wallingford, U.K.: CABI.

Li, Tania Murray. 2002. "Local Histories, Global Markets: Cocoa and Class in Upland Sulawesi." *Development and Change* 33, no. 3: 415–37.

Li, Tania Murray. 2014. *Land's End: Capitalist Relations on an Indigenous Frontier.* Durham, N.C.: Duke University Press.

Mathew, Joshy. 2011. *Tradition, Migration, and Transformation: Agrarian Migration to Wayanad a Socio-historical Perspective, 1928–2000.* Kannur, India: Institute for Research in Social Sciences and Humanities.

McCarthy, John F., and Robert A. Cramb. 2009. "Policy Narratives, Landholder Engagement, and Oil Palm Expansion on the Malaysian and Indonesian Frontiers." *Geographical Journal* 175, no. 2: 112–23.

Morrison, Kathleen D. 2002. "Pepper in the Hills: Upland–Lowland Exchange and the Intensification of the Spice Trade." In *Forager-Traders in South and Southeast Asia: Long-Term Histories,* edited by Kathleen D. Morrison and Laura L. Junker, 105–30. Cambridge: Cambridge University Press.

Müller, Birgit. 2012. "Farmers, Development, and the Temptation of Nitrogen: Controversies about Sustainable Farming in Nicaragua." *RCC Perspectives* 5: 23–30.

Münster, Daniel. 2007. *Postkoloniale Traditionen: eine Ethnografie über Dorf, Kaste und Ritual in Südindien.* Kultur und soziale Praxis. Bielefeld, Germany: transcript.

Münster, Daniel. 2012. "Farmers' Suicides and the State in India: Conceptual and Ethnographic Notes from Wayanad, Kerala." *Contributions to Indian Sociology* 46, no. 1–2: 181–208.

Münster, Daniel. 2015a. "Farmers' Suicides as Public Death: Politics, Agency and Statistics in a Suicide-Prone District (South India)." *Modern Asian Studies* 49, no. 5: 1580–605.

Münster, Daniel. 2015b. "'Ginger Is a Gamble': Crop Booms, Rural Uncertainty, and the Neoliberalization of Agriculture in South India." *Focaal: Journal of Global and Historical Anthropology* 71: 100–113.

Münster, Daniel. 2021. "The Nectar of Life: Fermentation, Soil Health, and Bionativism in Indian Natural Farming." *Current Anthropology* 62: S24.

Myers, Natasha. 2015. "Conversations on Plant Sensing: Notes from the Field." *NatureCulture* 3: 35–66.

Peluso, Nancy Lee. 2012. "What's Nature Got to Do with It? A Situated Historical Perspective on Socio-natural Commodities." *Development and Change* 43, no. 1: 79–104.

Peluso, Nancy Lee, and Peter Vandergeest. 2011. "Taking the Jungle out of the Forest: Counter-insurgency and the Making of National Natures." In *Global Political Ecology,* edited by Richard Peet, Paul Robbins, and Michael Watts, 254–85. London: Routledge.

Pollan, Michael. 2006. *The Omnivore's Dilemma: A Natural History of Four Meals.* New York: Penguin Press.

Ravindran, P. N., and K. N. Babu, eds. 2005. *Ginger: The Genus Zingiber.* Medicinal and Aromatic Plants—Industrial Profiles 41. Boca Raton, Fla.: CRC Press.

Ruf, François Olivier. 2001. "Tree Crops as Deforestation and Reforestation Agents: The Case of Cocoa in Côte d'Ivoire and Sulawesi." In *Agricultural Technologies and Tropical Deforestation,* edited by Arild Angelsen and David Kaimowitz, 291–315. Wallingford, U.K.: CABI.

Scott, James C. 2009. *The Art of Not Being Governed: An Anarchist History of Upland Southeast Asia.* New Haven, Conn.: Yale University Press.

Skaria, Baby P., P. P. Joy, Samuel Mathew, and Ancy Joseph. 2012. "Lemongrass." In *Handbook of Herbs and Spices,* 2nd ed., edited by K. V. Peter, 2:227–28. Cambridge: Woodhead.

Steffen, Will, Katherine Richardson, Johan Rockström, Sarah E. Cornell, Ingo Fetzer, Elena M. Bennett, Reinette Biggs et al. 2015. "Planetary Boundaries: Guiding Human Development on a Changing Planet." *Science* 347, no. 6223: 1259855.

Swanson, Heather. 2020a. "Curious Ecologies of Knowledge." In *Curiosity Studies: A New Ecology of Knowledge,* edited by Perry Zurn, Arjun Shankar, Pamela L. Grossman, and John L. Jackson, 15–36. Minneapolis: University of Minnesota Press.

Swanson, Heather. 2020b. "Multispecies Research." In *SAGE Research Methods Foundations,* edited by Paul A. Atkinson, Sara Delamont, Richard A. Williams, Alexandru Cernat, and Joseph Sakshaug. London: SAGE. https://doi.org/10.4135/9781526421036833388

Tsing, Anna Lowenhaupt. 2003. "Natural Resources and Capitalist Frontiers." *Economic and Political Weekly* 38, no. 48: 5100–5106.

Tsing, Anna Lowenhaupt. 2004. *Friction: An Ethnography of Global Connection.* Princeton, N.J.: Princeton University Press.

Tsing, Anna Lowenhaupt, Andrew Mathews, and Nils Bubandt. 2019. "Patchy Anthropocene: Landscape Structure, Multispecies History, and the Retooling of Anthropology: An Introduction to Supplement 20." *Current Anthropology* 60, no. S20: S186–97.

van Dooren, Thom, Eben Kirksey, and Ursula Münster. 2016. "Multispecies Studies: Cultivating Arts of Attentiveness." *Environmental Humanities* 8: 1–26.

Vasavi, A. R. 2012. *Shadow Space: Suicides and the Predicament of Rural India.* Gurgaon, India: Three Essays Collective.

Worster, Donald. 2004. *Dust Bowl: The Southern Plains in the 1930s.* New York: Oxford University Press.

Rubber Boots Methods for the Anthropocene

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