The Organic Monocrop

Experimenting with Green Growth on Indian Tea Plantations

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Abstract Under the banner of green growth, a number of theories currently promote new models that seek to decouple economic growth from excessive resource use and its adverse ecological impacts. But how exactly can one generate profit without disturbing ecologies? Drawing on ethnographic data from Indian tea plantations that are in the process of being converted to organic agriculture, this article examines specific attempts to alter the intersection of vegetal and financial growth. As a cultivation system, plantations intensify the manipulation of plant growth for monetary ends; they seek to mass produce and standardize valuable vegetal materials and radically simplify the ecologies that surround these monocrops. Taking a multispecies perspective, this article traces how green growth experiments seek to change the forms, rhythms, and ecological alliances that characterize the tea plant's growth. The article argues that, on organic tea plantations, green growth aspires to harness the unruly aspects of nonhuman life to make monocultures more productive. In the process, the nonscalable impulses of vegetal growth, unpredictable interactions with wildlife, and even the potentially harmful metabolisms of insects and fungi become integral parts of plantation cultivation—though not always successfully. The article widens our understanding of how green production methods are envisioned not as alternatives to but rather as support for industrial cultivation systems.

Keywords plantations, organic agriculture, green growth, multispecies ethnography, India

As organic cultivation is increasingly integrated into industrial agriculture settings and monocrops "grow green," the relationships between people and other species are changing. In this article, I examine the entanglements between plant growth and economic growth on three Indian tea plantations that are in the process of adopting organic cultivation techniques. Using multispecies ethnography, I show how tea planters try to steer their monocrops away from monogrowth by fostering diverse forms of other-than-human growth to sustain (and, potentially, even expand) industrial mass production. Organic tea plantations reveal themselves to be experimental compromises between profit and multispecies aliveness: nonscalable impulses of vegetal growth,

Environmental Humanities 15:2 (July 2023)
DOI 10.1215/22011919-10422256

unpredictable interactions with wildlife, and even the potentially harmful metabolisms of insects and fungi become integral parts of monoculture cultivation. Efforts to create new forms of tea plant growth are experimental rather than formulaic, but a profound transformation of the plantation economy is not their objective. Thus, the creation of a greener tea economy is driven by caution as well as by urgency, which highlights the conservative aspects of green growth ambitions.

In agriculture, human financial growth and the growth of nonhuman organisms are deeply intertwined. Metaphorically, economic growth is often described as akin to vegetal proliferation, for instance, as yield.[1] In this vein, agricultural practices can be understood as tools that manipulate other-than-human growth to benefit human well-being and commonly, under current economic systems, to generate profits. By compelling various organisms to grow more fruit, leaves, fat, or muscle tissue, people increase their own financial yield. How humans conceptualize economic growth influences how they try to stimulate, inhibit, or modify nonhuman organisms. In turn, the multiple patterns, textures, and rhythms in which agricultural plants and animals grow significantly impact human labor and life.[2]

Plantations represent a cultivation system that has intensified this manipulation of plant growth according to monetary imperatives, aiming at the rapid and almost continuous mass production of valuable vegetal materials.[3] Plantation monocrops are managed with the goal of, at least ideally, creating scalable, reliable, and rising revenue, and producing ever-higher yields for ever-expanding markets.[4] To minimize the unpredictable and potentially economic-growth-inhibiting aspects of vegetal growth, plants are standardized and removed from ecological networks. Monocrops are adapted to industrial schedules rather than being influenced by other-than-human rhythms—their growth even inhibits the growth of a multitude of other organisms that can no longer thrive on a plantation, or even in the surrounding region.[5] Highly monocultural growth does not guarantee steady financial growth, as they are particularly vulnerable to complete destruction by insects or fungi. As experiences from across various agricultural economies show, it is mostly because of its own side effects that monogrowth staggers and often fails, which makes it a form of "self-devouring" growth.[6] While efforts to develop ever more refined methods of simplification continue, such events remind us that decay is also an intrinsic part of vegetal processes.[7]

1. Marder, *Philosopher's Plant*, 19, 114.

2. Van Dooren, "Wild Seed, Domesticated Seed"; Beldo, "Metabolic Labor"; Krzywoszynska, "Nonhuman Labor."

3. Moore et al., "Plantation Legacies"; Tsing, Mathews, and Bubandt, "Patchy Anthropocene."

4. Tsing, *Mushroom at the End of the World*; Scott, *Seeing like a State*; Hetherington, *Government of Beans*; Besky and Padwe, "Placing Plants in Territory."

5. Münster, "Ginger Is a Gamble"; Grandin, *Fordlandia*.

6. Gan, "Unintended Race"; Grandin, *Fordlandia*; Perfecto, Jiménez-Soto, and Vandermeer, "Coffee Landscapes Shaping the Anthropocene"; Münster, "Ginger Is a Gamble"; Livingston, *Self-Devouring Growth*.

7. Lyons, *Vital Decomposition*.

What, then, are the possibilities to depart from monogrowth and its self-devouring? Multispecies perspectives often highlight unexpected, spontaneous interspecies collaborations on the margins of human-disturbed environments.[8] Such unruly constellations can sometimes propel small-scale transformation:[9] For instance, in Argentina, human protestors and the highly adapted "super weed" amaranth have joined forces to resist soy monocultures.[10] And in the Columbian Amazon, farmers compost leaf litter to create "vital decomposition" in poisoned landscapes.[11] So far multispecies literature has paid less attention to what happens when these alternative ways of growing are intentionally implemented, for instance, when larger producers attempt to transition to a greener agricultural economy.

The potentials of an "ecological modernization of capitalist agriculture" feature prominently in alternative growth theories that promote novel strategies for yielding human financial growth from nonhuman growth.[12] Under the banner of green growth, some of these theories have broadly influenced international and national policies and are being promoted by leading multilateral organizations (while other propositions, such as degrowth, remain on the fringes of political demands). Models of green growth seek to decouple economic growth from material throughput and carbon emissions. They envision continued economic expansion as measured by gross domestic product, while avoiding or reducing the negative impacts of overusing natural resources, polluting the land, driving species extinct, and emitting carbon. While green growth wants to depart from some of the mechanisms of monogrowth, it shares the ambition of growth as being ideally steady and accumulative and, preferably, not slow or recessive. Critics lament the lack of clarity about the mechanisms (mostly technological solutions) by which this could be achieved.[13] This element of uncertainty is also central to attempts at creating green growth on Indian tea plantations: not only are the novel cultivations highly experimental, and thus they frequently fail, but the planters are also reluctant to endeavor a more profound transformation of the plantation economy. Green growth is not just a potent economic narrative; it also generates new sets of practices and more-than-human relationships. This article follows the call for a greater accounting of how more-than-human relationships are actually changing under the green growth paradigm.[14] Here, multispecies ethnography can help to show how growth is reenvisioned locally and concretely through direct encounters and experiences with other

8. Tsai, "Farming Odd Kin"; O'Gorman and van Dooren, "Promises of Pests."

9. For the unruly, see Tsing, "Unruly Edges," who conceptualizes the unruly as interspecies interdependencies on the seams of imperial spaces such as plantations; and Krishnan, Pastore, and Temple, "Unruly Environments," who use the term more broadly to describe "the nexus where society and nature collide and coalesce" (5).

10. Beilin and Suryanarayanan, "War between Amaranth and Soy."

11. Lyons, *Vital Decomposition*.

12. Krzywoszynska, "Nonhuman Labor," 227.

13. Hickel and Kallis, "Is Green Growth Possible?"

14. Livingston, *Self-Devouring Growth*; Greenleaf, "Value of the Untenured Forest."

species. In this article I am specifically interested in how Indian tea planters—a group of middle-class and upper-middle-class plantation owners—imagine and experiment with new ecological relationships in their attempts to practice green growth on their plantations.[15] Greener tea production is attempted mainly through negotiation and improvisation rather than the mechanized, standardized procedures that plantation cultivation commonly strives for. By converting to organic agriculture, they hope to gradually adapt to the climatic changes and ecological problems they are anxiously observing, but without having to change their activities too radically.

Yet the introduction of new cultivation methods to the plantations does not get rid of either monoculture or the precarious labor that continues to undergird these partial transformations.[16] Elsewhere, I have detailed how the profitability of emerging green tea economies relies on the exploitation of an ongoingly marginalized workforce.[17] The green growth models that this article presents are sites of intensified interspecies inequality, where the well-being of productive other-than-human lifeforms is more highly valued than that of the human laborers who care for them. In this article I do not focus on unequal labor relations themselves but on the more-than-human relationships that emerge from them: while reconfiguring tea plucking and processing as forms of "green labor" does not improve the situation of the laborers themselves, it does change the position of the various plantation-dwelling organisms whose "nonhuman labor" suddenly becomes a source of productivity.[18]

How are the more-than-human relationships of plantations changing when planters aspire to make their businesses solutions to, rather than drivers of, environmental degradation? This article examines uneven organic plantation ecologies based on ethnographic fieldwork conducted for my doctoral research on three tea plantations in Darjeeling, Assam, and the Nilgiri mountains in 2016 and 2017. Over the course of six months, I stayed in the workers' accommodation and observed and participated in daily labor in the tea fields and factories. To understand the plantation as a more-than-human environment, I also used multispecies methods such as documenting other-than-human life forms in and around the tea fields.[19] Learning about the shapes and rhythms in which tea plants and other plantation-dwelling organisms grow in relation to the labor performed on them enabled me to ask more precise questions about how engagements with green growth reshape multispecies relations.

On the tea plantations I studied, the ambition to shift cultivation practices has required uncertain experiments in growing differently, growing together with other

15. For the increasing involvement of the Indian middle classes in alternative agricultural production and consumption, see for instance Frazier, "'Grow What You Eat'."

16. Besky, "Exhaustion and Endurance."

17. Kumpf, "Multispecies Monocultures."

18. Greenleaf, "Value of the Untenured Forest"; Krzywoszynska, "Nonhuman Labor."

19. Elton, "Growing Methods"; Hartigan, "Plants as Ethnographic Subjects"; Goldstein, "Ethnobotanies of Refusal"; Pitt, "On Showing and Being Shown Plants."

species, and growing beyond the plantation borders. These three new aspects of tea plant growth guide the narrative of this article as they describe crucial but partial transformations of the plantation form that I observed during my fieldwork. The planters aim, first, to diversify the monotonous regularity of the crop plant and, second, to encompass a broader range of organisms around and between the crops. Consequently they make use of irregular leaf shapes, the genetic diversity of seeds, or the plants' spontaneous responsiveness to the weather. And to some extent, the insects and fungi usually regarded as pests are allowed to carve out their own niches in the spaces that were previously exclusively dedicated to tea plants. Third, the planters want to foster beneficial conditions for the species who live in the vicinity, hoping to establish usefully biodiverse surroundings. Thus, some aspects of other-than-human growth conventionally considered undesirable now become valuable aspects of tea cultivation—but only on the condition that they support crop productivity in some way and help stabilize tea production in the long run. Organic techniques do not attempt to stop the unruly growth of other species, but rather to exert control through it—while simultaneously trying to retain the discipline and scalability of the plantation. As much as they require a willingness to improvise and embrace uncertainty, these experiments in organic monocropping are also cautious and conservative, reluctant to change more than necessary to accommodate the beneficial aspects of other species in tea monocultures. And they often fail, both because the agendas of other species are not easily made compatible with the demands of monoculture and because the many shortcomings of the plantation system are not overcome by these new cultivation methods.

Greening Tea Monocultures

At first glance, Indian tea plantations would appear to be unlikely sites for experimentation. Tea plantations are "colonial ruins" in the sense that their social hierarchies, labor organization, cultivation and processing methods, and commercial infrastructures have not significantly changed since British companies established the first estates in the mid-nineteenth century.[20] Tea workers are still paid below minimum wage and rely on meager food and housing provisions made by their management, tea bushes have been cultivated intensively and continuously for decades, and coal-fired colonial-era machines are still running in the old factory buildings.

Yet today, some degree of change is imminent, since these "ruin" ecosystems are increasingly exhausted:[21] soils are depleted, biodiversity is diminished, and microclimates are severely affected by climate change.[22] Many fear a loss in quality and quantity of the tea crop and anticipate the insecure future of the industry with growing anxiety.[23]

20. Sen, *Everyday Sustainability*; Besky, *Darjeeling Distinction*; Besky, "Future of Price"; Chaudhuri, *Tempest in a Teapot*; Chatterjee, *Time for Tea*.

21. Besky, "Exhaustion and Endurance."

22. Cf. Bishnu et al., "Assessment of the Impact of Pesticide Residues"; Chatterjee et al., *Biodiversity Significance*; Wordley et al., "Bats in the Ghats."

23. Cf. Jayasinghe and Kumar, "Climate Change May Imperil Tea Production."

At this crossroads, many companies and small-scale growers hope that the "premiumization" of specialty teas, such as organic certified tea, will help to increase or at least maintain profit rates that would otherwise be steadily declining along with yields.[24] India is already the largest producer of organic tea in the world.[25]

The three plantations that I introduce in this article present a cross-section of this rising trend. They show regional differences—while the sector is still rather small in Assam and the Nilgiri mountains, it is already quite significant in Darjeeling—but also varying appropriations of the plantation form. Both the planters Swaroop in Darjeeling and Vinod in Assam still largely adhere to industry conventions, and at first glance their plantations do not greatly differ from the conventionally cultivated tea monocultures that surround them. Swaroop's large estate in Darjeeling stretches over six hundred and forty hectares, and its workforce of around four hundred people is spread over seven labor line villages located on these grounds. After inheriting the already successful estate from his father and acquiring organic certification in the late 1980s, Swaroop's profits are rising steadily and he has become a well-recognized environmentalist entrepreneur even beyond the industry. Vinod represents a new group of investor-planters who try to copy success stories like Swaroop's. Before buying his tea estate in the early 2000s, he had already built successful businesses in other agricultural sectors. Vinod's middle-size plantation in Eastern Assam is a comparatively small estate of sixty-five hectares with a newly hired workforce of around forty employees. His attempt to transition a conventionally cultivated plantation into an organic one and to train his employees in the new methods has not been as lucrative so far, since the company has not yet managed to sell its products as expensive specialty tea. However, it can still sell standard quality to organic wholesalers at a reliable markup, and Vinod is confident about this project's future revenue. In the Nilgiri mountains of Tamil Nadu, small-scale grower Raju is pursuing a more radical transformation of his plantation, cultivating only nine hectares that visibly stand out between the uniform rows of his neighbors. Raju, too, is a newcomer to the industry, having quit his job as a biochemist in Bengaluru to pursue organic cultivation. But unlike Vinod and Swaroop, who survey their plants mostly from their offices, Raju performs most of the manual labor himself—and takes great pleasure in this "back-to-the-land" endeavor. He has refused to obtain certification and instead sells his tea exclusively via Facebook, retailing small quantities as high-end specialty teas for much higher prices than even Swaroop charges for his products.

These highly specific variations of tea monocultures show that growing green is not only shaped by the policies of the Tea Board of India or the UN's Food and Agriculture Organization but also influenced by the tea planters' own ideas. Trying out approaches like biodynamic farming, Vrikshayurveda (the "Ayurveda for plants"), or Zero Budget Natural Farming, Swaroop, Vinod, and Raju experiment with translating this

24. Cf. Seetharaman, "India's Tea Industry Is Struggling."

25. Intergovernmental Group on Tea, "Report of the Working Group on Organic Tea."

knowledge into strategies for managing plantations in times of ecological turmoil.[26] This is a broader trend in alternative agriculture approaches: at the interstices between standardized and codified organic certification and individual experimentation, new forms of ecological knowledge emerge.[27]

These are also crucially influenced by contentious debate between planters, supervisors, and workers. The supervisors and workers tend to know more about the tea plants and other species that they interact with on a daily basis, but planters mostly ignore their insights.[28] Frustration about this adds to the strain of labor: putting a wide range of nonhuman species to work often requires more effort than maintaining homogeneous rows of monocrop.[29] As a result, worker resistance is a common reason why organic experiments fail.

The following three ethnographic sections follow Swaroop, Vinod, and Raju in their attempts to grow their crops differently from those grown on conventional plantations, to grow together with other organisms, and to grow beyond the plantation confines.

Growing Differently

Although tea plantations may look identical at first glance, individual bushes often overgrow, grow too slowly, or sprout irregular leaf forms. "The work of monoculture" is generally concerned with standardizing these impulses, synchronizing them with industrial production, and maintaining a uniform productivity of plant growth.[30] In contrast, the three planters I discuss encourage specific forms of irregular growth and therefore purposefully invite vegetal spontaneity into their monoculture rows.

One such technique is to allow tea plants to grow into varying shapes. The growth of tea bushes is usually directed toward achieving a particular form of their commercially useful parts: fresh leaves and buds. Plucking only "two leaves and a bud" has been an official guideline since colonial times, because they are the most photosynthetically active part of the plant and contain a higher concentration of the chemical constituents that make a good drink.[31] The pickers pluck tea bushes at strategic intervals to ensure that fresh leaves and buds regularly regrow and don't instead grow into flowers and seeds. Plucking encourages specific growth forms and rhythms in the plants, while limiting other possibilities. But tea plants cannot continuously direct carbohydrates toward developing new shoots, so if too many shoots are removed too frequently, the bushes' productivity can collapse. When this happens, agrochemical fertilizers are generally used

26. Cf. Münster, "Performing Alternative Agriculture."

27. Galvin, *Becoming Organic*; Paredes, "Experimental Science for the 'Bananapocalypse'"; Flachs, *Cultivating Knowledge*.

28. Chao, "Seed Care in the Palm Oil Sector."

29. Besky and Blanchette, *How Nature Works*.

30. Besky, "Exhaustion and Endurance."

31. Chatterjee, *Time for Tea*.

to stimulate further growth, but their overuse depletes and contaminates the soil, posing a long-term threat to plant productivity.

In the Nilgiri mountains, small-scale planter Raju purposefully alters this monogrowth by letting his crop grow into shapes other than two leaves and a bud. Tea plants, varieties of the species *Camellia sinensis* in the family Theaceae, originally grew as small evergreen trees in forest undergrowth. It is only on plantations that they are trimmed into bushes. By letting his plants grow according to the shapes and rhythms in which they would have grown in a forest habitat, Raju tries to achieve a "stressless" state, as he called it. Since he has only a small area under cultivation, he knows virtually every one of his oddly shaped tea bushes personally and pays attention to their individual growth patterns rather than fixed production schedules. Plucking plants that have grown taller than his head and harvesting unusual leaf shapes, he admits that he can never be entirely sure about the results, and he has to reckon with meager harvests or batches that do not taste as good.

Such unconventional methods require unconventional pathways to profit. Since plucking this way takes much longer and cannot yield reliable results, Raju cannot take part in auctions and retail to a wholesaler. He has thus had to develop new channels of distribution. Through Facebook he sells his small portions mostly to foreign "connoisseurs" who value his unusual tastes and are willing to pay premium prices for them. He uploads videos of his special plucking and processing methods to advertise them as marks of distinction for his tea. By encouraging irregular plant growth, Raju's plucking method ideally not only prevents his plants from becoming exhausted but also creates additional value through their distinction from standard production. Thus, he trades off the ecological and financial benefits against the risk of failure.

Another way to diversify tea plant monogrowth is by varying propagation methods. Commercial tea plants are cloned (propagated through cuttings) so that they more reliably fulfill plantation requirements than plants grown from seed. Since the release of the first lot of three tea clones by the (British founded and funded) Tocklai Experimental Station in 1949, after decades of research, cloning has become conventional in the industry.[32] Today, cultivar series cater to various climates and soils, types of tea, types of insect or disease, and high yields. By increasing both the surface that plantings can cover and the level of control people can exert over plants in varying environments, tea plantations become more scalable.[33]

Although the thousands of bushes on Swaroop's plantation in Darjeeling have been grown from clones, he now tries to grow a certain number of them from seed as well, with the intention to gradually interplant them in the future. He has even set up his own nursery for this: a small, makeshift greenhouse built with plexiglass behind the large factory. Swaroop believes that growing plants from seed, right where they

32. Mondal, *Breeding and Biotechnology of Tea*.

33. Tsing, "On Nonscalability."

originated, will give them the opportunity to adapt to their particular place. He hopes that there might soon be a lineage of tea plants native to his plantation. This is not only a matter of pride: Swaroop is concerned about climate change, particularly about the unusual monsoons of recent decades. He fears that if weather patterns continue to change as rapidly, some clone types will not do so well in the future. Growing from seed, he makes available the genetic material that could be useful for future generations of clones. New plants for new weather patterns. Through his weather-adapted seeds, he makes use of the unpredictable aspects of tea plants' growth—not trying to control them, but to control through them. In changing climates the nonscalable diversity of seeds can expand (or at least preserve) the scale of the plantation by complementing the scalability of clones. In this case incorporating some degree of nonscalable diversity into scalable projects provides potential profits in an insecure future.

A third way of intervening in monogrowth is by allowing crops to grow in-between various other plants. On Vinod's plantation in Assam, the plan is not to alter the ways in which the tea bushes themselves grow but instead to let other plants that are generally considered to be weeds—vetches, grasses, or ferns—grow among them, like a miniature forest undergrowth. Conventionally the ground between the monoculture rows is kept neatly empty and sprayed with agrochemical fertilizer and pesticides. But using these products (before converting to greener cultivation methods) had previously depleted the soil, and Vinod now seeks ways to restore its fertility. In addition to organic, homemade fertilizer, ground cover plants store nutrients and moisture that otherwise would easily leach from the soil, and their roots are said to aid the network of beneficial microorganisms and organic matter. As a result, these tea fields often do not look monotonous at all—several sections are, in fact, quite overgrown. Particularly farther away from the factory, the outlines of the bushes are sometimes hardly recognizable among their manifold companion plants, which sometimes even grow higher than the tea plants.

Vinod and his employees debate the efficiency of this new arrangement. Some workers are frustrated with these "improper" growth forms and worry that the plantation will eventually turn into an actual, unprofitable forest. While the workers fear for the productivity of the plantation (and thus for their income), Vinod, for whom the investment in an organic plantation is one speculative venture among many different businesses, is determined to take the risk that this new system of organic production will take some time before it is fully functional. Ideally, he hopes, the companionship with weeds can support both his crop and his profits.

Vinod, Raju, and Swaroop want to allow plants (both tea bushes and others) to grow differently from the standard shapes and rhythms, because they want to incorporate the unscalable, irregular, and uncontrollable aspects of vegetal growth into mass production. For the planters, these different ways of growing bear the potential for continued profit in insecure futures. For tea plants, they modestly increase possible growth expressions and ecological alliances.

Growing Together

Instead of maintaining strict monocultures, the three planters I studied aspire to strategically include other species into their tea fields, which, ideally, all grow together for the benefit of tea plants. They do not just let in useful weeds as a ground cover but even extend this invitation to species that are normally labeled as pests. On plantations, the latter often have particularly drastic effects, because they can move undisturbed through monoculture rows, finding no resistance other than agrochemical pesticides, to which they often gradually grow immune. Tsing calls this feral proliferation "the unmanageable spread of plantation-augmented life in the form of disease and pollution" that is characteristic of plantation systems.[34] Vinod and Swaroop try to harness the feral quality that thrives with the plantation condition, to make it work for their production. I show this using the examples of the tea mosquito bug (*Helopeltis theivora*) and the fungus blister blight (*Exobasidium vexans*), which have been attacked as notorious tea pests since the nineteenth century. The planters hope that forgoing pesticides may help prevent the plantation ecosystem from becoming unproductive, and that the feral proliferation of pests may even become good for business, at least to some degree.

According to Darjeeling planter Swaroop, blister blight is an organism with great potential for organic tea production. When I asked about the whiteish-brownish dents I found on some leaves, Swaroop enthusiastically stated that this disease "makes the tea taste of cardamom."[35] The parasitic fungus is a common pest for South Asian tea and is responsible for major loss and deterioration of yield, as it directly affects mostly stems and tender leaves, the most useful parts for tea production.[36] Blister blight was first recorded as a tea disease in Assam in 1868, at a time when the colonial industry had just become lucrative, so tea planters were not familiar with it and were puzzled about how quickly it reached faraway places.[37] Swaroop risks proliferation of the blight because he appreciates the subtle variations of taste that fungal metabolisms effect in the phytochemistry of tea leaves, but also because his certification forbids the agrochemical pesticides that are generally used against it. For the most part Swaroop finds that his employees are able to keep the fungus at a profitable level by spraying homemade pest-repelling concoctions, which prevent excessive spreading. Thus, on the one hand, the marketable taste distinction is one of many organic characteristics that make teas more valuable and enable Swaroop to sell at a higher price point. On the other hand, forgoing agrochemical pesticides helps to keep the soil fertile. Letting fungi and plants grow together seems like a win-win situation, although the profit margin of this plant-blight alliance is rather thin.

The usefulness of tea mosquito bugs is less straightforward. Over the past decade, Indian tea growers as well as tea research institutes have observed more and more of

34. Tsing et al., *Arts of Living on a Damaged Planet*, 52; Grandin, *Fordlandia*; Perfecto, Jiménez-Soto, and Vandermeer, "Coffee Landscapes Shaping the Anthropocene."

35. Kumpf, "Organic Taste and Labour."

36. Sowndhararajan, Marimuthu, and Manian, "Integrated Control of Blister Blight Disease."

37. Dey, "Bugs in the Garden."

these small flies.[38] As in the case of blister blight, plantations create ideal conditions for their proliferation, which relies on their eating tea plants in all of their life stages.[39] Conventionally, synthetic chemical insecticides are used in rotation, even though this causes high levels of toxic residues in tea leaves.[40] But Vinod and Swaroop both told me that they are not as worried about tea mosquito bugs themselves as about the erratic monsoons, higher rainfalls, and extreme temperatures that increase their spread. So instead of spraying insecticides, the two planters have instructed their staff to track the spread of tea mosquito bugs by photographing and mapping them. This method not only indicates more exactly where the workers should apply the organic pesticides, but it also identifies some of the evolving weather patterns that the insects react to. The planters therefore want to use the bug maps to better adapt their plantations to these new circumstances. Vinod knows that areas in which tea mosquito bugs are abundant hold too much water, and he has instructed his workers to deepen the ditches for additional drainage, or to dig new ones. Swaroop plants out different tea clones in the badly affected areas—that is, those that can tolerate extreme weather; he has not specifically bred any to resist the bug.

Mapping pest organisms allows organic growers to better understand the ecological dynamics that envelop their plantations. They can neither expel tea mosquito bugs nor control the weather, but they can reposition themselves and their plants in a way that allows coexistence, and maybe even thriving, in uncomfortable situations. Thus tea mosquito bugs do not just eat and damage tea plants; they can also indirectly help tea plants to survive adverse weather conditions. The planters hope that, just as unpredictable seeds may help to guard plants against unpredictable weather, uncontrollable insects may help to bring the effects of such weather under control. Future profits require such risky compromises. But mapping insects is of course only a minor remedy; it does not fully harmonize the plantation with either the proliferation of bugs or with changing climates.

Because of both their unpredictability and their incompatibility with labor schedules, encounters between tea plants and their pests do not always reliably support tea production. But by letting some tea bushes be affected by blight and bitten by bugs, Swaroop and Vinod allow for a lively variation that is less toxic than pesticide-sprayed monocultures. Here green growth means looking for a compromise between the uncontrollable proliferation of insects and fungi and the reliable increase of profits.

Growing Beyond

Aiming to grow together with other organisms, tea planters also pay attention to the areas that surround their plantations. Since they are well aware that the disastrous

38. Reay, *Climate-Smart Food*.
39. Roy et al., "Tea Mosquito Bug."
40. Roy et al., "Tea Mosquito Bug."

effects of monocultures eventually bounce back on the plantations themselves, they hope to re-create a surrounding environment of lively multispecies interactions, which ideally fend off pest proliferation, soil degradation, and adverse microclimates.

Tea plantations are often surrounded by young woodlands that regrew in abandoned tea fields or on terrain that was difficult to cultivate. The species that inhabit these small patches are newcomers, since the land had been meticulously cleared of flora, fauna, and pests before the tea estates were established.[41] These are not only native species but very often also colonial imports, for instance, seedlings from shade trees (planted between tea bushes at strategic intervals to provide shelter from the sun), such as silky oaks, that have spread beyond plantation borders. As these newly assembled forests grow, animals are also returning to the area, a process that is further supported by the occasional closures of tea plantations in those regions where cultivation has become difficult.[42]

Organic tea planters try to support this development. Since he took over the management of his family's plantation, Swaroop has reforested almost half of his estate, partially to meet certification requirements but also for other reasons: much of the area had not been productively used before, or had even lain fallow, and cultivating it had been either impossible or would have required large investments in additional labor and processing facilities. Besides, reforestation also benefits tea production, since tree roots percolate into the subsoil and stabilize it, preventing the landslides to which the Darjeeling region is prone. The tea bushes also benefit from improved soil conditions, additional shade, and the birds that live in the woods and eat insects. Importantly, the woodland provides some protection from the hot summers and late monsoons of recent years by keeping the planted areas cooler and more moist.

Apart from these practical advantages, more diverse surroundings also lend nonmaterial value to the tea, since the plantation's apparent wildness and charismatic species are quite marketable. Swaroop advertises the "unique biotope" (as he calls it) around his plantation, which is one of the reasons for his fame as an environmentalist entrepreneur. He has instructed his workers to climb trees and install cameras to document wildlife, and the most spectacular sightings are then presented on the company website. Special attention is paid to two rare and charismatic species: great pied hornbills (*Buceros bicornis*, a large bird with a yellow casque on its beak) and tigers. Of course, neither of them directly interact with tea plants, at least not in a way that significantly affects their growth. But because both hornbills and tigers require large stretches of forest to survive, their presence testifies to the success of reforestation, and in turn allows the spectacular marketing of organic monocrops as supporters of biodiversity.

The presence of a total of three tigers (as he estimates) on his estate is a particular source of pride for Swaroop. There are, however, doubts about this number, and even

41. Besky, "Exhaustion and Endurance."
42. Besky, "Exhaustion and Endurance."

about the very existence of tigers on the plantation, since the territory should not be large enough to support a tiger population.[43] In my conversations with Swaroop's employees it was never clear if anybody had ever actually seen a tiger, or even traces of one (whereas leopard sightings were quite common). What's more, the photograph on the website shows only a stuffed tiger—a large piece of taxidermy that usually stands in the planter's office and had been either carried outside to be photographed or photoshopped onto a background image of one of the plantation's woodland edges. Swaroop told me that this tiger is a remnant of the colonial trophy hunting that once brought the species to near extinction on the subcontinent. He said that he keeps it in his office to highlight his commitment to preserving rather than killing wildlife. Tigers, and the healthy ecosystems they represent, are ideally part of a green-growth tea industry—though it is not always clear if this is a reality or an aspiration, a potential or an impossibility.

While tigers are supporting the profitable marketing of the tea crop, they make financial survival even more difficult for the workers. Even if not everybody is convinced of the cats' existence, many of Swaroop's employees are still scared of them, and they often tell horror stories of killings that happened on plantations in other regions. This is particularly troublesome since many workers rely on subsistence foraging and hunting but no longer dare to enter the woods on their own. When I joined them to collect firewood, navigating the narrow and steep paths through the undergrowth with swaying baskets on their backs, we made efforts to be very noisy and scare away the large cats that might or might not be there.

In the Nilgiri mountains, Raju is also very much in favor of such attempts to create diverse types of landscapes between plantations (which conservationists call "agro-forest mosaics"), and he himself leaves some parts of his fields uncultivated.[44] But what he has observed on these sites also has made him skeptical about the potential for success of these burgeoning experiments. The shrub *Lantana camara*, which was once used as a hedge plant for British colonial gardens, now dominates the surroundings of tea plantations.[45] Raju lamented that he has never seen the typical flora and fauna of the Nilgiri mountains anywhere but in a nature reserve. On his own property he has observed how lantana spreads quickly, choking every other plant in its wake. Now, Raju doubts that attempts to bring back biodiversity to the plantations' surroundings would result in anything but an invasive monoculture of lantana, which would prevent the useful diversity that both organic planters and conservationists envision.

Swaroop sees the possibilities of agro-forest mosaics in a more positive light. Apart from potentially creating profitable and marketable relations, they also inspire him to envision the continued expansion of tea plantations. Currently, he is looking to buy land in Nagaland, where he plans to establish a new tea estate. This is a trend: plantations are

43. Vaidyanathan, "India's Tigers."

44. Kshettry et al., "Looking beyond Protected Areas."

45. Münster, "Lantana Invades Teak Plantations"; Bhagwat et al., "A Battle Lost?"

increasingly being established in India's northeastern region, where the industry has not been widely present until now.[46] With his new venture into unchartered territory, Swaroop wants to avoid the efforts and failures of restoration that he experienced in Darjeeling. His future organic plantation is supposed to have healthy soils and usefully biodiverse surroundings from the start—but of course, it will also necessitate initial deforestation and will create more monocultures.

Organic tea planters envision that an intact, self-sustaining ecosystem would benefit their production if they could manage to harmonize cultivation processes with the wildlife of an emerging multispecies community. The intricate interactions between a myriad of species—predatory, invasive, and rare—would then no longer be a threat but instead a supporting dynamic for the monocultures in their midst. But they have not encountered pristine biodiversity beyond the plantation borders, nor can they easily influence the species that populate those environs. Growing beyond the plantation often means marketing biodiversity rather than actually letting it emerge.

Conclusions

Drawing on the specific example of Indian organic tea plantations, this article has portrayed green growth as the ambition to harness the unruly aspects of other-than-human life and direct them toward the productivity of monocultures. Nonscalable impulses of vegetal growth, erratic interactions with wildlife, and even the potentially harmful metabolisms of insects and fungi become integral parts of plantation cultivation. Instead of radically simplifying ecological relationships to grow a standardized crop, organic tea planters aim to achieve the same effect through deliberate—but nevertheless unpredictable—multispecies entanglements.

This article has shown that, ideally, green growth efforts help to make an ecologically precarious system viable enough that it can be sustained for longer, even in increasingly troubled environments. While some observers fear that the increasing heat might soon make it impossible to grow tea in Assam, or that erosion might limit the Darjeeling industry, organic practices provide hope that it is possible to adjust plantations to climate change and to alleviate other ecological problems. But rather than long-term solutions for the multiple crises facing the tea industry, these experiments merely effect their temporal deferral. The three planters I introduced do not so much transform ecologies as tweak them: they create fragile connections within the plantations' grand interruption of interspecies relations. Within the colonial or capitalist ruins of plantations, organically cultivated patches offer one-part restoration, one-part continued ruination, and many new uncertainties.

This presents green growth not as a field of radical possibility but one of pragmatic compromises: between visions of green profit and the ongoing reality of exploitative

46. Chatterjee et al., *Biodiversity Significance of North East India*.

work, between multispecies aliveness and new forms of controlling ecologies. If the current historical moment holds the potential to transform eco-social relations, it is important to study green growth projects, not because they offer the best possible solutions but because they represent what many people consider to be plausible. Supporters of green growth often refuse radical change and instead want to counter the unimaginable but seemingly inevitable prospect of ecological breakdown with compromises. This reluctance to change, this mixture of inertia and urgency, of crafty compromises and their frequent failures, characterizes experimental ambitions to sustain productivity in the Anthropocene.

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Acknowledgments

This article profited from the comments received at the "Anthropology of Politics and Governance" colloquium at the Max Planck Institute for Social Anthropology. I am also very grateful for Jovan Maud's editing and the anonymous reviewers' attention to detail. My doctoral research was funded by the Hans-Böckler-Stiftung.

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