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Soil Science, Development, and the “Elusive Nature” of Colombia’s Amazonian Plains

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R E S U M E N

Desde el 2000, la gobernanza y capacidad productiva de los suelos Amazónicos surge como un asunto político en la “Guerra contra las Drogas” de EEUU-Colombia. Los científicos estatales son convocados a producir una entidad clasificable cuya definición depende de sus cualidades productivas: un “buen suelo” es robustamente productivo, orientado al mercado, y una entidad perfectible mediante la acción humana. No obstante, agricultores en el departamento del Putumayo realizan prácticas materiales donde los suelos son menos un *objeto* que un *enredo* de relaciones propagadoras de vida. Desde una perspectiva etnográfica en fincas y laboratorios, este artículo reflexiona sobre cómo las prácticas ‘científicas’ y ‘locales’ con los suelos pueden (o no) posicionarse en simetría. Los suelos Amazónicos no solo cuestionan los sistemas de clasificación del Estado y sus agentes humanos, sino que revelan límites a los imperativos del desarrollo donde la ‘producción’ está basada en una profunda división entre ‘naturaleza’ y ‘cultura’. [relaciones suelos-humanos, análisis simétrico, estudios sociales de la ciencia y tecnología, ética agrícola, Amazonia Colombiana]

A B S T R A C T

Since 2000, the productive capacities and contested governance of Amazonian soils emerged as a matter of political concern in the U.S.–Colombia “War on Drugs.” State soil scientists are enlisted to engender a classifiable entity whose definition makes it emerge from productivity: good soils are thickly productive, market-oriented, and an entity that can be improved after human action. A network of farmers in the department of Putumayo, however, engages in material practices where soils are less of an object and more of an entanglement of life-propagating relations. With ethnographic engagement on farms and in laboratories, this article offers insights into the way “local” and “scientific” practices with soils are able (or unable) to be placed in symmetry.

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Amazonian soils may not only place pressure on state classification systems and their human agents, but may also reveal the limits of development imperatives where production is premised on a deep-seeded divide between “nature” and “culture.” [soil–human relationships, symmetrical analysis, science and technology studies, agricultural ethics, Colombian Amazon]

“*RIGHT OFF THE BAT*, we say a farmer is planting in degraded soil. This is a different soil. It is almost as if the organic material rejects mixing with the mineral elements. It is totally irregular,” Dr. Cortés explains to me. Unlike conventional agricultural-driven colonization where farmers are not only encouraged but legally required to clear the forest in order to “work” (and hence gain property rights over) the land, he laments that this same practice in the Amazon yields only two or three continuous harvests before soils are said to be *acabados* (ruined, washed up). This leaves many farmers faced with the necessity of beginning the “vicious cycle” all over again.¹ We are seated in the Direction of Agrology at the Colombian Geographic Institute *Agustín Codazzi* (IGAC), a state agency Dr. Cortés supervised for ten years, and where he now works as a (semiretired) consultant. Above his head hangs a poster of dark, robust dirt cupped between two hands. “Care for our soils,” it reads: “The future is not only in your hands, but also below your feet.” This particular visit to the IGAC occurred near the end of my fieldwork, at Cortés’s insistence that an “ethnographic lens” on small farmers’ concerns in the southwestern frontier department of Putumayo—where I had spent the last two years following what my Putumayo farmer friends call “Amazonian-based agricultural practices”—would be of great assistance to state soil scientists who had not consulted with local communities during their survey trips.²

I tried to imagine Heraldo, my closest farmer friend, crouched down harvesting root vegetables beneath a knotty mass of creeping plants while he explained to these scientists that “soil” as an entity would be hard to find on his farm because it is always an entanglement of relations and cannot be otherwise. Furthermore, from Heraldo’s perspective, agricultural-based life projects have little to do with “knowing” the ground upon which one is standing, and more to do with *afinando los sentidos* (fine tuning the senses) to what is going on up and down and all around one’s body. “Can you guess what our problem is right now?” Dr. Cortés’s booming voice ricochets off the walls of the small office where we are seated, drawing my attention back to a stack of documents conforming the IGAC’s as yet unpublished Putumayo soil survey laid out on the desk in front of me. “It is the same problem we have had for the last thirty years. What are these soils good for? What do we tell the nation? Pasture . . . forest conservation.” He referred to a dilemma that

had become as much a political problem as a scientific and technical one: “If we repeat what we said in 1979 . . .” Dr. Cortés’s voice tapers off, and he remains tense and silent. One of his colleagues quickly chimes in: “Well, it would just be embarrassing.” When I returned to the IGAC almost a year and a half later to inquire about the Putumayo soil study, I learned that it remained “on stand-by” for further “technical considerations.”

Ethnographies of scientific practices have addressed the question of how different ontologies are brought into being by showing that “reality does not precede the mundane practices in which we interact with it, but is rather shaped in these very practices” (Mol 1999:75). Along these lines, Bruno Latour’s (1999) ethnographic account of the way soil scientists conscript or stabilize a phenomena called “soil” explores the way that “soils” are produced through a complex set of cultural practices engaged in by real people, rather than simply being a bundle of natural determinations waiting for the expert’s successful unveiling. This article builds on ideas from recent conversations that have taken place at the intersection of political ecology and science studies into the potential for a symmetrical analysis of both scientific and nonscientific definitions and practices (Goldman et al. 2011; Heller 2007; Mathews 2011; Tsing 2011; Verran 2002). I place science studies analysis in conversation with farmers’ soil knowledge, and the conceptual fecundity and differing ethical obligations that emerge as scientists and farmers engage with the sensuous element upon which their livelihoods and lifework depends. Borrowing from Latour’s (1993) and Stengers’s (2000) concepts of symmetry, I regard both scientists and farmers as engaging in worlds where the differences between human and nonhuman elements (“culture” and “nature”) are generated through complex and embodied practices, rather than presupposed and permanent ontological divides. Neither group is more distant or closer to a nature that is separated from culture, and thus neither has access to or engages with a nature that is devoid of political struggle and potentiality. I am particularly interested in the partially coinciding and diverging relationalities that emerge from caring for the soil *for* the purpose of scientific interest and economic imperatives, and from caring *with* a world full of beings that mutually nourish each other. At the confluence of armed conflict, repressive antinarcotics policies, and military-led development interventions that have imprinted upon the soils of Colombia’s western Amazon over the last 30 years, this article explores the limits and possibilities—alternative temporal registers, ethical imaginations, and capacities for freedom—that may emerge along with these different modes of relating—not only for the lives of soils, but for those who engage with “soils” as partners in/for life.

To explore the way Heraldo and Dr. Cortés produce two different (although mutually interacting) entities when they say the word “soil,” I rely on what Viveiros de Castro calls a process of “controlled equivocation” (2004). Uncontrolled equivocation refers to a type of communicative disjuncture at which the interlocutors are

not talking about the same thing, and do not know this. However, these apparent misunderstandings do not occur because of different perspectives on a common world, but rather because the interlocutors are unaware that different worlds are being enacted (and assumed) by each. In other words, “an equivocation is not just a ‘failure to understand’ but a failure to understand that understandings are necessarily not the same, and that they are not related to imaginary ways of ‘seeing the world’ but to the real worlds that are being seen” (2004:11). Thus, controlled equivocation would be the awareness of, or the making explicit that, a type of communicative disjuncture may take place when different worlds or ontologies meet. On this basis, a disagreement or struggle over the meaning of “soil” may be produced because farmers’ and scientists’ locally situated (albeit mutually interacting) practices enact different worlds—worlds, by extension, of which soils form a part. Along the same lines, the appearance of an agreement about the meaning of “soil” might actually occlude radically different entities for state soil scientists, bureaucrats, and the diverse networks of farmers I came to know in and around Putumayo. Furthermore, the awareness that an equivocation is occurring is not only a revelation available to the anthropologist in her enterprise of translating or communicating cultural difference. The shifting value of soils for scientists and farmers, or the particular quality of “living” that they have come to grant to soils, and the respective ways these values inform, are contested, or rendered marginal by policy makers is a contentious topic of conversation among both groups. However, while Heraldo and other farmers are able to control the equivocation when they speak of “soils”, state soil scientists largely find themselves unable to do so, in part because they confront an element that eludes or undermines the categories and practices they use to measure, describe, and employ it.

A Chronicle of the *Selva y coca*

First occupied by missionaries in 1558, and then spontaneous waves of colonization throughout the 19th and 20th centuries linked to along series of extractive-based economies (quina, rubber, timber, oil), state presence has been historically marginal to life in the Colombian Amazon—a region that currently comprises 35 percent of the national territory (Aguilar 1999; Taussig 1987). Historians argue that nationalist sentiments were sparked toward the region during the rubber boom of the 1930s and as a result of Perú’s encroachment into Colombian territory, culminating in the Colombia–Perú War (1932–1933) (Palacio 2004). Farmers were recruited to defend the county’s borders and construct roads connecting the Amazon to the Andes; they were later joined by settlers who had been displaced from the nation’s interior agricultural centers due to political violence during a period known as La Violencia (1948–1960).

IGAC agrologists were eager to share tales of their own early days of fieldwork in the Amazon when they confronted a “deceptive” contrast between aerial views of exuberant tropical forest canopy and the less than equally robust and fertile topsoil that lay below. The “enigma of Colombia’s Amazon plains,” as I often heard them refer to it, mirrors tensions in neighboring Brazil and Perú that emerged between state planning for agriculture and the reality of a soil that is not conducive to a “productive” agricultural frontier (see also Fearnside 1985; Schmink and Wood 1992).³ Soil scientists enlisted by the state in the 1970s to conduct the first modern national resource inventory of the Colombian Amazon, PRORADAM, were trained to work in the county’s temperate interior and fertile coastal zones where soils are generally a meter deep and acquire 90 percent of their nutrients from weathered minerals stored in their uppermost horizons. In contrast, the Amazonian plains appeared more “litter layer” than “soil.”⁴ Generally described as “thin, acidic and poor,” agrologists continue to produce a long list of “naturally limiting factors” that includes soils’ “bad genetics,” “old age,” “mineral deficient” parent rock, and rapid erosion by heavy rain once forest canopy has been felled (see also Cortés and Ibarra 1981; León 1999). Furthermore, the dominant clay base is an extremely weathered kaolinite with high levels of aluminum and iron oxide, rendering soils inhospitable to many commercial crop varieties without substantial “corrective” measures (i.e., lime and heavy fertilization).

Dr. Cortés told me that it was the most recent bonanza of so-called illicit coca cultivation and its violent ties to paralegal groups that captured not only the state’s attention but international scrutiny. Contrary to agrologists’ expectations, however, what would soon become a full-fledged “War on Drugs” relied on military intervention to secure both the rule of law and the possibility for (licit-based) capitalist development in the region. “What happened? Coca happened. Right when we published our findings the Amazon became an obstacle for state security. We weren’t able to influence its economic development or even its conservation,” he said.

Anthropologist María Clemencia Ramírez (2001) cites 1978 as the year when commercial coca crops first arrived in the department of Putumayo. Production continued to increase with the arrival of leftist guerrilla groups, narcotraffickers, and paramilitaries throughout the 1980s and 1990s. By 2000, Putumayo registered 40 percent of the nation’s coca production, leading not only coca crops but entire regional ecologies to become potential targets of Plan Colombia—the ongoing U.S.–Colombia antinarcotics policy (UNODC 2005). Farmers and other settlers who had been left to their luck etching out a livelihood in a region with little infrastructure, market access, or conventionally “fertile” soils have been met with crop duster planes and manual eradication brigades. Military action intending to eradicate coca is coupled with U.S. Agency for International Development (USAID) programs that have unsuccessfully aimed to substitute illicit export-oriented coca

with legal export-oriented crops, such as cacao, pepper, vanilla, and heart of palm.

After September 11, 2001, the “War on Drugs” progressively began to overlap with the global “War on Terror.” In 2002, the U.S. Congress removed restrictions on Plan Colombia funding, enabling Colombia to use antinarcotics resources for military operations against organizations classified as terrorists, as well as their purported civilian collaborators.

IGAC soil surveys—comprised of maps, field observations, and laboratory analysis—are a specific technology used to represent the nation, in which scientific knowledge about soils produces both a classificatory device and the material infrastructure upon which there is an intention to build national development. Bowker and Star (2000) note that infrastructure speaks to an invisible background for other kinds of work that give meaning to it, and here the progressive accumulation of official soil surveys functions at a performative register to enact a nation-building project perceived to have coalesced in the 1930s. These early surveys were primarily dedicated to assessing land value and made possible not only the state’s initial acquisition of property tax, but also the institutional consolidation of state soil science itself.⁵ Throughout the 1940s, soil maps focused on the county’s Andean region and progressed outward, becoming a basis for the representation—indeed production—of a national territory. From the outset, soil scientists were enrolled to identify the nation’s soils in taxonomic terms in order to make technical recommendations for their practical use. IGAC agrologists sometimes referred to themselves as the nation’s “soil doctors,” commissioned to treat a “natural body” in order to ensure its good health and its gainful employment both as a resource and as a form of national patrimony.⁶ It is the soil as a classifiable entity with a potential working “vocation” that is of interest to state development imperatives that compare areas of the nation’s territory on the basis of its productive capacities. Thus, state classification of soils renders them as working infrastructure in the most commonsense way: as that which underpins actual structures such as buildings and roads, and as a medium for the production of yields, head of cattle, or more recently, environmental services.

Under public law, technical recommendations for soil use are intended to underpin territorial zoning plans that, in turn, inform municipal, department, and national development strategies. Accordingly, more costly and detailed soil maps are commissioned by professional associations and private industries or through co-financed agreements between private actors and the state. They are reserved for what soils scientists refer to as the “more promising areas” of the country. Thus, these maps, rather than national territory, represent specific national interests that aim to identify the fertile soils upon which capitalist agricultural development and growth depends. Within its heterogeneity, soil science continues to question how it is that the discipline became so firmly tethered to agriculture at the expense

of situating soils in their multitemporal and multipurpose environmental scales. IGAC agrologists lamented not only the soil's glaring absence in the nation's environmental agenda, but also the gradual dismantling of their professional niche, which, they argued, had been picked over by an assortment of experts, especially from the field of agronomy. In other words, if the future lay below our feet, as the poster in the IGAC office forewarned, agrologists had begun to worry that care of the soil was no longer in their professional hands.

It is no wonder then that Putumayo's soil studies have historically evolved in patchwork fashion and at lower resolutions: there were no consistent national interests attached to them until the advent of the "War on Drugs." Pockets of information exist about the more densely populated Andean-Amazonian foothills and early outposts of military colonization, and detailed studies of Putumayo's most fertile valley, Valle de Sibundoy, are archived in the institute's library. "We know what to do with these soils because they resemble the Andes. The problem is the Amazonian plains, and even more so, the plains impacted by coca, cattle, agriculture in general," says Marco, one of the agrologists working on the Putumayo survey. "Not only are we uncertain about their productive potential, but good zoning is limited by the lack of public order." Marco goes on to recount how his technical team can only retrieve samples of soil from pastures or other deforested areas for fear of tripping landmines planted in the *monte* (scrubland or jungle) by armed groups. They must seek permission from leftist guerrillas to enter their strongholds, and this does not guarantee that equipment will not be confiscated on the way out. After a decade of aerial fumigation campaigns, local communities are deeply suspicious of state employees, whom they perceive to be potential informers on the whereabouts of "illicit" coca crops. The list goes on, and Marco imparts a scenario in which agrologists are caught between a rock and a hard place. However, from their perspective, this rock is gradually becoming barely recognizable soil, and the hard place is tropical forest "besieged" by a hardy shrub called coca.

IGAC agrologists, whose potential object of study is elusive and difficult to access—thin, old, violent, and dangerous—find themselves working for a state whose vision of the western Amazon has been monopolized by an itinerant sea of coca monitored in terms of hectares rather than being attentive to the particularities of local soils. As perceived by the state and the knowledge it is able to enlist, the classifiable entity that it intends to enroll in national development policies is either nonexistent or violently occupied. In either case, soil, as an object of study and a potential resource, is unable to emerge without networks of research that depend on shifting political conditions that may extend far beyond the consent of the state. Thus, while I have begun by referring to a preexisting entity called soil, the rest of this article explores how an entity called soil may emerge (albeit partially or not at all) through the different political and affective relations and embodied labor of small farmers and state soil scientists.

Ojos Para Ella (Eyes for Her)

Traveling toward the municipality of Santa Marta at dawn illuminates a contrast between panoramic views and the military tanks and soldiers patrolling the sides of the highway. As we dip around a curve overlooking the expansive Río Cauca, we meet the same four tanks that have been stationed here for months. It is August 2010, and Heraldo, an animal husbandry technician and farmer whom I am accompanying, asks why the soldiers keep parking on the same bend and leaving themselves vulnerable to mortar fire by guerrillas. We peer out the truck's window: what look like thumbprints pressed into the side of the mountain expose patches of rust-colored soil between low-hanging clouds and dense forest canopy. Heraldo tells me these are scars left behind by heavy rains. Ripping up tree roots and sending chunks of earth crashing down, naked soils are left to bake beneath an intense equatorial sun. This entire area is designated an "unstable geologic zone," as the highway sign warns. Ironically, a plastic banner hangs next to it, stating: "Travel with confidence, your army is on the road." One of the passengers comments on the "insecurity of security," and as we leave the department of Putumayo and cross into a subregion referred to as the Media Bota Caucana, we are in the middle of the *piedemonte-amazónico* (Andean-Amazonian corridor), where eastern foothills jut against and meld into rainforest plains. What results feels like a hundred microecologies with their tiny shifts in temperature and sundry organisms; diverse plant and tree life hovers above wetter, heavier soils.

Today we are visiting a small farmer named Edelmo to discuss a proposal for his new farm. Having defaulted on a loan on their farm in the neighboring Andean department of Nariño, Edelmo and his family migrated to Santa Marta in 1999 to follow the coca and illegal timber booms. After extracting *cedro*, *guamo*, and *sangretero*—grueling work that leaves both man and mule as good as dead, local people often say—Edelmo saved enough money to grow a 12 hectare seedbed of coca that he sold for \$2,500, which was sufficient to invest in a farm with three of his brothers. However, intensifying aerial fumigation campaigns, and widespread arrest of farmers found with gasoline, cement, or food assumed to be destined for the leftist insurgency, led to Edelmo and a group of neighbors organizing the voluntary eradication of their coca. Now he was back to coffee, plantain, and subsistence farming, which had been his family's previous vocation in Nariño. "I kept looking for the soil, those quality soils we were used to seeing. After eight years experimenting on the farm, we're still learning how to practice permanent agriculture here," he says, as we hike past coffee bushes intermixed with fruit trees, a few vegetables, henhouses, and pens of guinea pigs. Edelmo is the leader of a group of 30 families interested in growing what he calls, "more ecological Amazonian coffee." After the local Secretary of Agriculture failed to support the initiative once he learned that it did not involve raising cattle, Edelmo spent a

month hiking up and down a nearby hill with his cell phone to catch the spotty reception that allowed him to call the National Federation of Coffee Growers (FEDECAFE) in Bogotá. However, FEDECAFE kept telling him that he was not located in a coffee growing zone. “They tell me it is the wrong thermic floor with the wrong class of soils, and they refuse to come out to see how far we have come along or to even taste the quality,” he tells us, visibly frustrated. Furthermore, the regional office of the Colombian Institute for Rural Development (INCODER) keeps denying him a land title for the new farm his family is planning across the highway. Largely primary forest, he solicited a title for 69 acres, 40 of which will remain forest and 29 that he intends to exploit agriculturally. When asked why two-thirds of the area would not be “improved” he explained to state officials that he wants to incorporate natural forest into his agricultural model. However, INCODER rejected his application and instead issued him a title for what they considered an economically viable “working farm.” Edelmo questioned seemingly contradictory state environmental and development discourses and policies. On the one hand, state officials argued in favor of forest conservation and cracking down on an “unorganized” and expanding agricultural frontier. On the other, national development plans actively partitioned the region into concessions for industrial oil and mining initiatives, crop duster planes zoomed overhead spraying herbicidal agents, and the military bombed supposed insurgent camps and in the process destroyed tropical forest.⁷ As we head down a slippery bank, Edelmo sheepishly acknowledges a row of coca plants that, he tells us, stubbornly rear their heads whenever he looks the other way.

Despite the complications with INCODER, the family says they plan to forge ahead with their project. In the kitchen, among his family, Edelmo unfolds a hand-drawn map of the new farm, *Melina*, named after his youngest daughter, and tells Heraldo that he invited him today because of his reputation as a practitioner of Amazonian-based farming. Locally known as *el hombre amazónico* ([what I translate as an Amazonian human), a name that Heraldo crafted to mark a contrast between the Amazonólogo scientific experts who began to visit the region in the 1980s, and a dispersed network of Putumayo-born farmers who have been *learning with/from* the region over the last 50 years. As Heraldo explains it, the latter do not consider themselves experts who come and go—sometimes to the benefit of local communities but often to their detriment—receiving public funds and academic merits to make technical recommendations for the region. Rather, they consider themselves practitioners who struggle, work, live, and die *in/with regional ecologies*. This is not to say that they fail to recognize scientists as practitioners or potential interlocutors with valid knowledge. However, these farmers perceive scientific practices as emerging from different orientations that may feed *off* rather than *from*, and thus *back into*, the life cycles of *la selva*. The Amazonian human is one in which the human—what it means to be human—necessarily disappears into the

Amazon. In other words, humans are not knowers or leaders, but are obliged to become part of the ecological assemblages that compose and decompose life in the *piedemonte amazónico*.

Before Edelmo goes on to share the details of the new family agroforestry project, Heraldo suggests conducting an inventory of the current farm. What does the family buy? What do they produce? What is their relationship with *la selva*? After making a list, the balance unequivocally tips to one side. They buy just as much as they produce and only eat five “wild plants”: cilantro *cimarrón*, passion fruit, custard apple, the *mil pesos* palm, and something that looks like a cherry, but they are uncertain of its name. Openly admitting to their unfamiliarity with the plant life growing around them, they tell us they never fish in the river and do not have a garden, conventional or otherwise. Heraldo interjects:

We have this idea that we have to eat what we plant and if we don't have a place to plant, then we buy food or go hungry. Agronomists tell us that to farm we have to correct the soil and grow high-yield market varieties. They say any other way is backwards, and now we are the ones who have become poor, dependent consumers. What if cultivating here means cultivating your own *ojos para ella* (eyes for her)—*la selva*?

As the months passed, I learned that cultivating *ojos para ella* relates to a whole series of practices that shape living and dying in *la selva* and that extend beyond human-oriented production and consumption. Furthermore, “not having a place to plant” did not necessarily refer to a material lack, but to ruptured relationalities: an uneasy estrangement from the dynamic myriad of associations that compose (and decompose) the place in which one is physically standing, and thus, from the world of which one forms a part. During the ride back to Putumayo, Heraldo tells me that neither Edelmo nor INCODER are *enredados* (entangled) with *la selva*. Edelmo is hesitant because when he looks out beyond the limits of his crops he sees a strange world of *rastrojo* (weedy regrowth), while INCODER is unable to see anything but a physical space that should be “protected,” “policed,” or “worked” (i.e., they see hectares of land).

During our next visit, we head across the highway from Edelmo's current farm. Hiking up a slick path, the familiar heads of palm trees and *ceibas* tower above less imposing varieties. Seeds as big as fists litter the underbrush; fallen fruit, rotting rinds, layer upon layer of branches, and vines that twirl up and down and all around us (see Figure 1). “What do you see?” Heraldo asks, and before we can answer he says, “I see a salad.” He smacks his lips and I imagine him digging into the array of entrées that begin to surface before our eyes. Edelmo and I quickly realize that we inhabit a landscape that is at once the same, but very different. Weeds become salad, tree bark unveils poignant spices, and a dozen tubers, nuts, fruits, and vegetables emerge out of corners of the woods. A trail of leaf cutter ants

Figure 1 *Harvesting Tubers in the Media Bota Caucaña. All photos taken by author.*

drags a meal underground. We steer clear of fist-sized venomous spiders near tiny waterfalls only to have our necks nipped by fire ants on the other side. Heraldo stops to gather *buchón*, an aquatic plant that absorbs heavy metals, and suggests that Edelmo sow several rows near the family's drinking water. He then begins to point out a pattern of leguminous trees such as *guamo*, which fix nitrogen; palm trees and ferns that concentrate phosphorous; and waxy-leaved trees like plantains that pump potassium to an underground invisible and hungry world of roots and critters: "You have to chemically fertilize with 10–30–10 to create accessible N-P-K," he says, doing an impression of the agronomists who have accompanied different phases of Plan Colombia. "We say no. NPK is all around us created by communities of plants and microorganisms. They feed each other while they nurture the ground. If you don't trust me, at least reach an agreement with *la selva*. She won't allow for impositions," he tells us.⁸

Heraldo and I often joked about what I liked to call his *selva* glasses; however, more than a lens that farmers strap on to gaze at the tropical forest, I understand “having eyes for her” as one element in what Isabelle Stengers refers to as an “ecology of practices” (2005). In this context, multiple, partially connected practices for working and eating that need each other because none of them offers a total or adequate response for how to “get along” with/in *la selva*. For Stengers, an ecology of practice is a tool for *thinking through what is happening* and *not recognizing*; thus, what is at stake is “giving the situation the power to make us think” (2005:185). This necessitates the suspension of our habitual categories and general claims that one practice may be defined like any another. Each time a practice or tool for thinking is passed from one person to the next, one hand to the next, one flux of organism–mineral–air–water–seed–rootlet to the next, this practice will be simultaneously reshaped and rejustified. Stengers reminds us that practices cannot be separated from their “environment,” and when we approach them in a deliberative and constructive manner, as they diverge in response to each situation and the questions and concerns relevant to these situations, they may enable the creation of “a different practical landscape” (2005:187).

Heraldo conceptualizes “having eyes for her” as having eyes for *la selva* in all of one’s senses—in fingers, feet, and tongue. For example, having “eyes for her” helps the Amazonian human learn to walk differently, experience new tastes, identify forgotten seeds, cultivate “weeds,” hear plants, and sense “vibrations.” Having “eyes for her” means leaving a human-led sensory field in order to follow the *selva* without preestablished human mastery or leadership. Thus, when IGAC scientists refer to the Amazon as *selva* or *bosque* (I translate both as tropical forest), their usage of *selva* is meant to represent a kind of landscape and ecosystem. However, when Heraldo employs *selva* it is both a conceptual tool and a series of material practices that allow a growing network of farmers to learn to *cultivate through the act of being cultivated*. *Selva* is a mode of relating or, better yet, of learning to think relationally; it is a mode of inhabiting that forces farmers to slow down their own thinking. Following the conceptualization of these farmers, *selva* becomes vital entanglement, co-adaptive construction, complexity, and laboriousness. It speaks of intimate, ongoing, and mutually obliging relations among organisms and elements—of which farmers are a part. For these farmers, *bosque* potentially simplifies this complexity, given that it can refer to a single species of tree. *Selva* also works to resignify *monte* (scrubland or jungle) and *rastrojo* (animal fodder, “weedy” regrowth) when they are used to describe the Amazon as an unruly landscape that should be either feared or tamed, and hence colonized.

On farms I observed experimental practices that have emerged along with farmers who learn to *see with la selva*. During my conversations with Heraldo, he described a process of what I came to think of as becoming the *selva*’s apprentice.⁹ This did not necessarily mean submission to her, but rather striving to become

one among many actors who labor in the act of living and struggling together—a struggle that may place them at odds at the same time as it allows them to innovate new arrangements and life possibilities. These farmers are slowed down precisely by *la selva*'s rapid intensities (nutrient cycling, soil decomposition, rainfall). Families have begun to recover noncommercial seeds and experiment with recipes, replace Andean potatoes with autochthonous tubers, and cultivate communities of shrubs and trees that generate their own N-P-K; they collect human and animal feces to nourish microorganisms and plants that, in turn, help prepare food for humans. Heraldo is among a dispersed group of Putumayo farmers who design crop layouts following the direction and intensity of the sun, producing multilayers of foliage that, in turn, produce soils that are always disappearing in the process of becoming someone else's nutrients or sediment. These farmers recommend replacing fenced-in, ground level gardens that require constant tending, chemical inputs, and replanting after each harvest. They instead grow orchards where creeping plants and tubers roam "free" and continually produce food for humans and other beings. However, no new agricultural model exists—only seeds, experiences, stories, and proposals—to be shared and refashioned (or not) from one farm to the next. What joins these farmers is their desire to create alternative ethical-material landscapes with their corresponding economic, political, and ecological possibilities and limitations. This entails not only questioning what it means to define "a soil" as "productive," but also a market-oriented and ultimately human-centered notion of productivity itself.

Many farmers living in the *piedemonte amazónico*, such as Edelmo, express similar problems to those of IGAC agrologists. They seek to locate and work a "productive" or "quality soil," and when this soil cannot be produced, they turn to a specific range of solutions that include fire, fertilizers, cattle, and abandonment. It is precisely the ephemeral and fragile constitution of "soils" that is claimed to thwart human projects. However, for Heraldo and others, the problem to be solved is not the same, and thus taxonomic classifications of soils intended to determine their "productive capacities" do not offer solutions to the "enigma of the Amazonian plains." These farmers do not contend with "soils" that are "poor" or even ones that are "different." Soils are a relationality into which they also disappear—and become something else that they also compose. Soils are not an object, but a living force and relational movement—sunlight, lunar cycles, decomposing elements, rootlets, fungi, flooding rivers, rainfall, and human hands. Even when farmers interact with state officials, they do not often articulate "soil" as a stable object, but rather as a bundle of relations that do not leave anything behind—not pests, urine, weeds, or even their own feces.

The legal occupation of property is premised on a subject-object relation driven by farmers who are expected to raze tropical forest; however, Heraldo and others propose complicating notions of property on two levels. One, their "private"

farms are always/already open “farm schools” for community members interested in exchanging Amazonian-based agricultural practices and ethics. Second, rather than participate in further deforestation, they propose “recolonizing the farm with *la selva*” to become part of the self-limiting cycles that allow life—seeds, plants, insects, humans—to reclaim a place occupied by commercial coca crops and their official USAID alternatives. Thus, an entity that IGAC agrologists portray as fragile and elusive may simultaneously yield recalcitrant strength—the potential for new and contingent alliances with/in regional ecologies. In other words, when “productive soils” are no longer enrolled, alternative “practical landscapes” may become possible, and hence, what these farmers refer to as alternative agricultural-based life projects as well. Cultivating “eyes for her” is why the farmers I came to know spoke less of “soil” than scientists and policy makers, and necessarily pursue radical alternatives not only to commercial coca, but also state and USAID-led development models.

State Soil Science: Classified within Classification

As we trek across a muddy field in Fusagasugá, Cundinamarca, an elderly woman leans over her patio banister to offer us a cup of coffee while Oscar, the agrologist I am accompanying, explains that her property is part of a “pilot zone” the IGAC deems representative of the dominant relief and climate in the municipality. “Would she mind if we stopped *para levantar* ([to lift]) some soil samples from her farm?” Immediately, the woman nervously assumes that our visit is related to land valorization for state taxes. However, once Oscar assures her that the samples will be used to determine soil vocation for the municipal development plan, and not directly the family’s property taxes, she waves us on our way. Oscar and two local men hired for the day begin to dig a 60-centimeter deep cavity, revealing what scientists call a “soil profile,” which produces both an object of study and a sense of pleasure as we admire the diverse colors and textures of the world beneath our feet. This vertical cut exposes what in standard soil science is referred to as the O, A, B, and C horizons with their corresponding depths, hues, and sculptures. In such details a soil is said to express its “personality,” through which agrologists interpret the “soil’s speech.”

From cow pastures, stony hillsides, and mossy forest floors I watch as “soil samples” become such—as what to me is mud—leaves behind a thick existence (locality, historicity, multiplicity) to be sealed in plastic bags for the two-hour journey to the National Soil Science Laboratory in Bogotá. While in the field, Oscar begins a classification process using a Munsell color chart, which translates levels of moisture. He tells me that slate hues suggest water may not be channeling freely through the soil horizons (see Figure 2). With a simple lens he analyzes pore

Figure 2 Hellige-Troug Soil Reaction (pH) Test.

size and counts rootlets, and uses a hand kit to test for the presence of sponge-like volcanic ash that may signal a reserve of water is underfoot. Texture is categorized in terms of sand, silt, and clay content. He adds a few drops of water to different pieces, rolling them into tiny balls in the palm of his hand. Sticky, greasy, or coarse is then jotted down under “consistency” on his clipboard. Before moving on to the next dig, Oscar records the vegetation, land use patterns, and other visible characteristics of the surrounding terrain.

In Latour’s (1999) account of soil scientists in action in the Brazilian Amazon, he conceives of Munsell color chart, lens, water, coordinates, and clipboard as a series of “intermediaries” that form part of a successive chain of transformations that allow a bounded entity to be abstracted. None of these intermediaries resemble anything; rather, they do more than resemble. As Latour notes, they take the place of the original situation without ever substituting completely for what they have gathered. What scientists seek and work hard to produce is a portrait of soil as a unique individual, with an inner working considered reflective of its “nature”: it is always a kind of soil; no generic category exists for this entity. Like much modern science, they rely on methods that reduce a vital nexus to increasingly simpler parts that can be expressed in the language of statistical equations. Latour refers to this as the double work of reductionism that simultaneously provides “amplification,”

Figure 3 *Sorting Soil Samples.*

or the possibility for greater standardization, calculation, and relative universality. At the same time, scientists recognize that soils defy summation of parts and, thus, resist complete dismemberment into a set of isolated essences or things. When the earth beneath our feet is uncovered, I witness the first movement of substitution, in which matter situated in the world, or what Latour calls the “real soil,” becomes the soil known to agrologists. Clumps of earth begin to be bound up in words, numbers, symbols, and graphs—the “inscriptive devices” that enable the passage of these clumps to text, according to Latour. Simultaneously, the career of agrologist is fashioned—an authoritative representative is born—and the soil has changed states in order to change locations; it now travels, without alteration, to remain relatively intact through space and time. However, as Latour warns, the world can return to confusion at any point along this displacement.

When we arrive back at the IGAC, bags of dirt are sent to the laboratory and divided up among different scientific disciplines (see Figure 3). I watch microbiologists separate out dead plant roots from living organisms before they place the bags in a refrigerator to retain humidity. They struggle to ensure that what was once teeming with life continues to harbor a measurable quantity. Soil physicists weigh the samples and leave them out to dry on the rooftop, sifting and weighing them again once all the water has evaporated. However, this may take weeks, depending

on Bogotá's infamously fickle weather, and work schedules are dependent on the relative humidity, hours of sunlight, and levels of precipitation on any given day. Chemists receive what by now is a powder-like substance and proceed to dilute it even further into test tube sized solutions. As Oscar explains, each time a humus colloid is disaggregated into its most basic chemical components, scientists arrive at an acid of a slightly different nature. Hence, humus demands that the same experiment be run six times to coordinate differing results.

Oscar is not unlike other soil scientists with whom I spoke or whose work I read; he argues that the scientific production of knowledge about an entity they call soil is convoluted business. Understood to be the result of a combination of factors such as climate, the biological activity of microorganisms and other larger creatures such as worms and humans, topography, and parent rock material, scientists conceive of soils as formed by *interactions* between "natural elements," and to a lesser extent, cultural practices. However, unlike chemical components, organic molecules, and organisms that vary discontinuously from one to the next, they describe soils as a continuous skin stretching over the surface of the earth—a mosaic that changes perpetually, even when sharing similar parent rock material and climate. Hans Jenny (1980), one of the fathers of modern soil science, characterizes the physical and conceptual messiness of separating out "soil" from the larger terrestrial ecosystem when he asks: How does one decide where tree roots end and soils begin when they are always co-evolving? How does one know if they are looking at a soil or a swamp after heavy rain? From soil scientists' perspective there is infinite potential for a new object to appear: continuity and discontinuity are blurred. In order to partially reign in this limitlessness, in order to know *a particular soil*, they must impose a set of operational boundaries—and they know these boundaries are arbitrary, as is how "a soil" is made to emerge. What Oscar later interprets as humidity, pH level, fertility, and clay and organic content is a partial re-representation of continual relations that were necessarily severed in the journey from field to color chart, laboratory, refrigerator, and test tube solution. It is what allows him to define the sample we lifted with precision as an Inceptisol: young, acidic with low fertility, 50 percent chance of susceptibility to erosion, and of limited agricultural use.

Furthermore, this classification of soils entails a comparison of a specific kind, in which a definition of what is "fit/unfit" organizes the things compared in a hierarchy. From a scientific perspective, soils are defined within a taxonomic system based on their "natural" properties; however, as outlined earlier, taxonomic orders in themselves are not of interest to the state. Rather, what is of interest is the additional sorting of these groups into technical classification for potential soil use. In Colombia, both classificatory systems were officially adopted in the 1970s from the U.S. Department of Agriculture (USDA): soil taxonomy (12 orders) and land classification capabilities (eight classes).¹⁰ The latter hierarchically organizes

soils according to limitations that have an impact on their use for the production of conventional crops and pasture plants without deteriorating over time.¹¹ Accordingly, agrologists are expected to scale up from a portrait of a *particular soil* to the level of *units of land* based on a classification system embedded in development imperatives that valorize agriculturally productive soils over all others. Thus, soils first become an object through their separation from land as the terrestrial ecosystem. However, their definition at once feeds back into land use management in its dimension as property or workable acreage with potentially productive capacity. Following Bowker and Star's (2002) relational understanding of infrastructure, soils are also that which emerge *between*—between what scientists define as “natural properties,” mediated by technologies and emergent with differential value within tax codes, loan approvals, development plans and, as Edelmo showed us, the possibility of engaging in specific state-sanctioned agricultural life projects and dreams. It is in this double process of producing *soils*—whose value depends on their ability to be translated into agriculturally productive *units of land*—that IGAC agrologists employed to work in the Amazon become perplexed. Indeed, they find themselves confronting new problems that result from the very solutions posed by classification.

Conclusion

As I learned with farmers, the impermanence of soils in the Amazon—their fleeting and metamorphosing existence—makes them less of an isolatable entity than continuous, relational movement. Unable to be extricated from an entangled web where every element is implicated in the existence of the other, they thus come into existence through an “intra-relating” (see Karen Barad 2007). That is, to be entangled is not simply to be intertwined, as in the joining of separate and preexisting entities, but to lack an independent, self-contained existence outside of the relation itself. State soil scientists are initially constrained by a classification system premised on subjects who define objects rather than thinking from within the messiness of relations. In other words, they are faced with the dilemma of how to render the land productive when no land can exist without a soil that is intimately at one with and feeding back into *la selva*. The engendering of “soil” as stable entity versus living with “soils” in perpetual relation is an inherent contradiction in the notion of “productive land.” I watched this complex relationality remain a site of struggle for agrologists as the material and ethical force of scientific classification came to the fore.

As noted in my conversations with Dr. Cortés, in the 1980s a small group of agrologists began to describe Amazonian soils as “different” rather than simply “poor” or “deficient.” However, this “difference” is embedded in an ontological

framework of comparison in which definitions of soils are based on natural conditions in temperate zones (depth, chemical fertility, neutral pH levels, longevity, youth), as well as on moral codes delimiting their legal and proper use. “Difference” inherently implies a deviance from a productive standard, which traps scientists in a hierarchy where “different soils” inevitably become problematic ones. Institutionalized conventions of soil classification contend with an “elusive nature” that can never be fully grasped in terms of an implicitly human-led logic of social explanation. Agrologists must contend with a terrain that stubbornly persists beyond the necessarily limited reach of their inscriptions and underpinning economic rationale.

Bowker and Star (2000) invite us to consider classification as a work practice in which individuals make decisions that lead them to use categories in which they may not wholeheartedly believe. Interestingly, it is Dr. Cortés, credited with institutionalizing USDA soil classification systems in Colombia during his tenure at the IGAC, who would also be one of the first to publish articles questioning its universal applicability—particularly its unbridled development-oriented imperatives in the Amazon’s tropical forests (1981). He initially expressed his discomfort with a mechanistic, physical–chemical (or three-dimensional) approach to the study of soils by conceiving of them as *el teatro de la vida* (the theater of life) (1991). Life in this context not only refers to the biological component of soils in their taxonomic dimension, or to the inextricable entanglement of living matter and inorganic material—the potential to harbor and sustain life that scientists argue makes soils soil—but also to the socioeconomic and political relationships that, he argues, link soils with literacy, soils–economy, soils–health, and soils–land distribution. Instead of an “Andean mentality,” he has urged colleagues to assume a “conciliatory stance” toward the region by imagining agricultural systems that would both care for soils and guarantee their “rational and productive use.”

More than a mentality, this nation-making lexicon refers to a historically informed concept of “production” premised on a separation from a nature that is seen as both object and patient, which acquires value once its “inherent limitations” are overcome through industry and human inventiveness. In reference to the Putumayo soil survey, he tells me, “We should make recommendations that totally change soil use and management instead of forcing the region to fit into USDA taxonomies. It would be excellent if we could recommend agroecology or agroforestry.” However, IGAC agrologists are constrained by their classification systems and their institutional positions, their funding imperatives, and their status as technical advisors and not policy makers.¹² Furthermore, while state soil surveys imply fieldwork, they do not entail consulting with rural communities, which have their own situated and conceptually informed material practices with/in Amazonian ecologies. Rather than rush in like the experts Heraldo refers to ambiguously as *Amazonólogos*, or the USAID-hired technocrats whose alternative

development packages are criticized for contributing to an inefficient history of land use and poverty in Putumayo, agrologists prefer to postpone the publication of the department's soil survey. I read this "standstill" as an active hesitation: one way they may manifest a moral dilemma or sense of inconformity with the treatment Amazonian soils receive within dominant agricultural paradigms, even when they author the studies that inform these very policies.

Given that the western Amazon has entered into the third phase of Plan Colombia, and a national development plan that is powered by mining, oil, and agribusiness initiatives, many urgent questions remain about the future of agricultural livelihoods in Putumayo. Heraldo first introduced me to Dr. Cortés's articles because he finds them to be a kind of scientific ally for farmers refusing to participate in extractive-based agricultural systems, which they argue includes all export-oriented crops (including coca) that lead to a dependency on commercial seeds and inputs. Dr. Cortés's call for a "conciliatory stance" opens up the possibility for a conversation that questions the transformation of *selva* into unsustainable farms—if not between state officials and farmers, then at least among farmers. However, his proposal also falls short according to Heraldo because it further emphasizes human actors who *manage* the land, and thus presents alternative agriculture as a technical substitution rather than an ethical stance and a relational ecological proposal for coexistence in the region. A sustainable approach to soil management is not a radical enough proposal for farmers who do not seek to isolate, "correct," and "employ" an entity for the sole production of human food and profit. Heraldo and other farmers pursue sustainability with the understanding that growing food for humans necessarily implies nurturing an array of organisms that collaborate with (and oblige) farmers to regain a relative autonomy from chemical companies, aid packages, and other imperatives of capital. By representing Amazonian soils within a broad taxonomic order (mainly, weathered Oxisols and Ultisols), IGAC agrologists have only been able to produce a disappointing soil at the bottom of a hierarchy that almost negates its existence, because to exist with dignity, soils have to produce economic "outcomes" and not entanglements. In this way, the dense relationality of Amazonian soils not only places pressure on state classification systems and their human agents, but may also reveal the limits of development imperatives in which production is premised on a deep-seated divide between "nature" and "culture." The contemporary purpose of this is for the former to produce for the life of the latter—or better yet, to be eaten by the latter.

Earthy Aesthetics

When I look out across the rooftop of the IGAC, it is as if I am looking out at a Colombia of burnt reds, charcoals, tans, and coffee-colored hues. Tiny mounds

of earth from every corner of the country are laid out on scraps of brown packing paper. The sun beats down. Piles of dirt sweat. If I spin around fast enough the world becomes a clay-colored pinwheel shot through with shades of gray, white, and blue. What times are we treading on? What ignored, multiple times? When everything visible to the naked eye was pushed up and turned over, sucked back down, and stirred around again: when all this was undulating grassland, now calloused skin hardened by the wind.

Farmers living near the vast rivers of Putumayo tell stories about the episodic floods that inundate their fields. They place tiny markers in the streams to chart how fast the water is rising. On the lookout for electric eels and snakes that will soon be set loose on an unlucky dog, hen, or human neighbor. A thirsty ground percolates, then gurgles, and gasps for air as it swallows up the garden and kitchen chairs. The air turns unusually cold. Then silence. An unearthly, primal silence they say makes them want to scramble up the trees.

This happens over and over again. Farmers count back as long as they can remember, and take comfort in the tiny plants that will soon sprout out of seeming lifeless debris. Fallen tree branches and fence posts rot and feed a hundred eager mouths. Butterflies and bees find their way back to the farm. Perhaps this cycle permits a kind of proximity, a window into other times. Times that interrupt a human life but inevitably press on and double back again. Times that are not marked by the future-oriented linearity of project end dates, funding cycles, and the four-year development schemes embedded in electoral politics. Times that we have to enter into relations with in order to sense or imagine much less ever know. Michel Serres refers to this as the difference between living *in* time and living *out* in the weather (1995).

There is something about how time is calendared within our brief human lives that does not bode well for a life lived over thousands even millions of years or one that can be destroyed over a few harvests. Most of us cannot taste when the soil is suffering. We cannot breath in and recognize that it may be weary. Soils seem solid and ageless if they seem anything at all. We have come to expect to step down on an earthy block firm and lasting, to exploit the same ground from one year to the next. When yields plummet or fields dry up and blow away, there is a flash of remembrance. We are obliged by inextricable ties—long geologic hours, hurried human time, and microscopic moments of renewal and decay.

One soil scientist in Bogotá interestingly described it as seeing a tuft of hair, but not a face. We see grass to be cut, plants to be harvested, and trees to be felled; a vessel where life grows up and out, but does not intermingle. We are haunted by what ecologist David Wolfe warns is a “surface chauvinism” that fails to recognize our existence is one with all that is out of sight and below our feet (2001).

In his poetic reflection entitled, “On Becoming Lovers of the Soil,” agricultural philosopher Frederick Kirschenmann (1997) describes the practice of “seeing”

soils as a sensual experience much like erotic love. Becoming intimately involved with their life, beauty, potent aromas, and tiniest of nuances. Their pain and resilience, surprises and limitations. He refers to this as an “inner” seeing, a seeing by attending to and being in touch with. More than becoming involved with the lives of soils, however, I learned with farmers of the sharedness of life. Hosts and guests become muddled. We never know if we have overstayed our visit or are welcoming others to settle in. Always both perhaps as the world loops around again.

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Notes

¹In Colombia, state discourses about small farmers’ supposed destruction of tropical forest ecosystems are deeply enmeshed in political debates over “illicit” coca cultivation (see IGAC 1997). The notion of “intentional labor” buttressing the titling of property—in which a human subject is established through his or her capacity to “add to” and “transform” the land by subjecting an extraction process to “intentional subjective control”—has long underpinned colonial and subsequent national political and economic paradigms (Povinelli 1995). Clearing forest as a mode of establishing ownership is a state-supported practice ubiquitous throughout Latin America, precisely because the state has historically viewed forested landscapes as empty.

²IGAC soil scientists refer to themselves as *agrólogos*, and while one reviewer of this article argued against my use of the translation of their professional title as agrologist because “it is a word used mostly in Canada and without much further acceptance in the English-speaking world,” I have decided to follow the terminology used by my informants in Colombia. Between 1962 and 1994, the *Departamento de Agrología* (Department of Agrology) at the University Jorge Tadeo Lozano in Bogotá trained around 400 *agrólogos*. In 1993, they described their profession as “the study and integral management of soils for the production of food and fiber, including classification of their physical-chemical, mineralogical and biological properties, geographic distribution and possible use and conservation” (El Tiempo 1993). Hence, my use of agrologist should not be confused with *agronomo* (agronomist). In Colombia,

agronomists consider issues relating to soil management, but within the science of the cultivation of land and crop production, whereas agrologists perceive themselves to be *voceros* (spokespeople) for the soil in its specificity and integral management and conservation.

³This “enigma” partially harks back to what Raffles and WinklerPrins outline as a stubborn genealogy bridging 19th century theories of perceived agricultural backwardness in the Amazon—due to the “indolence-inducing effect on race of a too fertile nature”—with cultural ecological narratives of the late 20th century that describe identical social effects under a rather different environment—a “harsh setting of nutrient-poor soils” (2003:167–168). They refer to the work of anthropologist Julia Steward and Smithsonian archaeologist Betty Meggers in establishing Amazonia as the principal ethnographic proving ground for cultural ecological theories of environmental determination.

⁴Colombia’s *Proyecto Radargramétrico del Amazonas* (PRORADAM) (1974–1979) was commissioned by the IGAC, the Ministry of Defense, and the Inter-American Center for Photointerpretation; it combined remote sensory imagery with fieldwork to collect samples. PRORADAM categorized the Colombian Amazon into three large soil groupings: 80% denuded plains and 20% formed by rock structures or sediment from Andean and Amazonian-born rivers. It concluded that 1 percent of Amazonian soils are apt for intensive perennial crops, 18.3 percent for conventional agriculture and livestock, and 81.6 percent are unfit for agriculture and have severely restricted vocations (República de Colombia 1979).

⁵For a detailed account of the history of Colombian soil science, see IGAC (1995). Along with Craib (2004) and more recently Scott (2009), I argue that surveying and mapmaking were never mere technical procedures: they remain profoundly social and political practices to facilitate national economic development, political administration, and state consolidation.

⁶Soil scientists define soil as a natural body, conveying an entity with an age, internal organization, and genesis. Most do not consider soils to be alive in the traditional biological sense, but rather a living system that sustains a wide range of biological activities.

⁷The Media Bota Cauca is riddled with complex and unresolved land titling controversies between INCODER, Colombia’s National Parks, oil companies, industrial mining concessions, indigenous communities, and small farm holdings (see Jeremy Campbell’s article in this issue on similar issues in the Brazilian context).

⁸Nitrogen, phosphorous, and potassium (N-P-K) are considered the most important macronutrients required for plant growth. 10-30-10 is a commercial concentration of N-P-K that is widely sold in synthetic fertilizers.

⁹My notion of practitioners is influenced by Stengers and Pignarre’s (2011) proposal for apprenticeship, or what she argues is an experimental process of learning rather than knowing through pedagogy or scientific expertise. Stengers proposes thinking without a progress narrative or a guarantee that we approach practices or things as we know them, but rather as they may become. Thus, apprenticeship with the *selva* may allow for a different attentiveness to becoming: the orientation of practice toward the nurturing of multiplicity that pushes beyond our habitual categories and practices.

¹⁰See USDA (1999). For a historical case study of the implementation of U.S. soil taxonomy in Colombia, see Tally (2006).

¹¹See USDA. Class I, II, III soils are categorized as slightly restricted for agriculture, while VI, VII, and VIII are deemed severely limited, unsuitable for cultivation, and restricted for grazing, forestland, wildlife, or aesthetic purposes.

¹²Agrologists consistently emphasize that potential land use recommendations do not necessarily influence actual use but more frequently conflict with it. They often cite that only five of the nation’s 14 million agriculturally apt hectares are being utilized, while cattle production exceeds soil vocation by 20 million hectares (FEDEGAN 2011).

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