Three Ways of Seeing a Forest: On the Social Life of Economization in Indian Carbon Forestry

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Abstract

Irrespective of controversies and frustrated efforts, carbon forestry—the sequestering of greenhouse gases in forests—remains a key element of climate change mitigation. Carbon forestry drives regularly rely on a market-based conservation framework, where forest dwellers are remunerated for their service of maintaining forests through dedicated financial instruments routing global funds. In this article, I turn to India's first large-scale carbon forestry project, situated in the hills of Himachal Pradesh, and trace how carbon forestry plots are subjected to different temporal trajectories on different levels. I show that the marketing of emission reduction certificates (CER), underpinning carbon forestry, posits emergent forests as permanent sinks. The administrative procedures of this Indian carbon forestry project, however, aim at providing for these forests for sixty years. Finally, I show that villagers perceive a sense of closure, suspending dedicated care and governance routines as the project appears to dismantle and future payments become uncertain. I argue that these different temporal registers not only reveal contradictions within carbon forestry approaches but they also highlight the fragility of attempts to economize forests through supposedly green financial instruments and, therefore, the limited impact of what might appear as neoliberal agendas, in time.

Keywords

Carbon forestry, climate change mitigation, temporality, numbers, India

Introduction

Afforestation projects in India are mired in tension. This World Bank-backed carbon forestry project is no exception. Implemented by the Forest Department in India's

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Himachal Pradesh, it not only aims at turning bare slopes into lush greenery. The project rather aims at providing and securing tree cover on dedicated plots in order to turn these into carbon sinks, thereby enabling modest steps toward the mitigation of global warming. Given these considerations, the decision which trees to plant and to care for had been far from trivial. Project staffers and project guidelines stressed that emerging plantations are housing a healthy mix of different trees species (MHWDP, 2011). Alongside sequestering greenhouse gases in trees and producing resilient groves, this would ensure enriching biodiversity while providing for diverse non-timber forest produce for involved communities. Decisions which species to plant and in what density were taken, I learned during interviews with staffers,[1] in consultation with villagers to cater to their demands. During fieldwork, however, it struck me that most plantations effectively were monocultures featuring pine trees alongside minor bushes and grasses.

In the Western Himalayas, ideal forests are said to consist of oaks trees (Berreman, 1972; Guha, 2000). Many of my interlocutors in project villages, however, told me that they had wished for either the majority or entirety of planta-tions to accommodate pine trees. They preferred this species, I was told, because it provided excellent timber making for good homes. The monoculture, in other words, was good to axe, at least partly, and its existence subjected to recurring demands of adjacent households, contrary to how it features within global or national climate change mitigation initiatives. Obviously, this carbon forestry project's monocultures are subject to divergent and clashing temporal trajectories ranging from near future demands of household consumption all the way to attempts to permanently fix the atmosphere.

Forests are key elements in climate change policies the world over. Crucial for adaptation strategies, they also figure prominently in mitigation efforts (see e.g., Government of India, 2015; Lele & Krishnaswamy, 2019). A number of project streams and funding instruments aim at reducing the concentration of carbon dioxide in the atmosphere by sequestering vast numbers of this troublesome greenhouse gas within organic matter and soils (Gupta et al., 2013; Gutierrez, 2016; Phelps et al., 2010; Singh et al., 2013). In addition to serving as the globe's green lungs, as a longstanding environmentalist motto has it, forests now are increasingly valorized as sinks safely storing, or so it seems, gaseous compounds threatening planetary survival. The accumulation of biomass in forested terrain or in dedicated plantations appears as critical component of navigating long tempo-ral arcs of anthropogenic climate change involving rather deep histories of excess emissions and the uncharted terrain of the Anthropocene futures (Agarwal & Narain, 1991). Such temporalized concerns intersect with the rhythms of forest growth and project cycles now frequently harnessing a language of market-based conservation or results-based payments. In other words, temporality is writ large in carbon forestry, while trajectories of temporal envisioning lay bare up tensions within such forestry projects.

This article traces temporalizing accounts embodied in India's first large-scale carbon forestry project, situated in the hills of the Himalayan state of Himachal Pradesh. I argue that being attuned to the ways temporalities are being articulated, envisioned or built into project procedures provides a lens for accounting for the

ephemeral and contested nature of market-based conservation projects and attempts to financialize climate change mitigation efforts. Complementing important critiques of imperilled rights and access to forests (Fairhead et al., 2012; Leach & Scoones, 2015; McElwee, 2015) or of the sustainability of forestry projects (Aggarwal, 2014), in this article I turn to the reorganization of trees as marketable carbon stock and consider how people navigate this reorganization in time.

The economization of trees as carbon stock, of course, does not occur in a vacuum. Economic sociologists have studied the emergence of carbon markets as experimental setups involving proliferating actors and institutions. In this perspective, markets are not simply given but outcomes of dedicated arrangements and require that things or services are rendered economic—a process dubbed economization (Çalışkan & Callon, 2010; Callon, 2009). In this view, in requires efforts to render things as commodities, while any commodity may be used in non-market exchanges (such as gifts) or cease to be a commodity altogether (such as freed slaves), thereby highlighting ubiquitous temporal dimensions of economization.

In India and elsewhere, forests are situated within diverse economic activities, spanning from harvesting of non-timber forest produce over strictly regulated usage of sacred groves all the way to state ministries' auctioning of forests to logging corporations (Agrawal, 2005; Guha, 2000; Vasan, 2006; Vasan & Kumar, 2006). While most of these cohere around extraction, carbon forestry renders standing forests as a commodity, ideally silently amassing carbon dioxide as plants grow. The language of carbon stocks aligns well with financial imagery. It evokes accumulation, quantification, trade and turnover. The entanglement of carbon sequestration programs and the world of finance, however, is the outcome of strategic attempts by supranational institutions and national funding agencies and corporate actors bent on generating markets for pollution rights coinciding with finance's ever-restless search for new venues of accumulation (Brand, 2012; Gorz, 2010, pp. 122–124). To the extent that the carbon market is concerned with the absorption of $CO2$, and not only with the calculated reduction of potential emissions by, say, the implementation of less polluting technologies (Böhm & Dabhi, 2009), a greenhouse gas-absorbing apparatus was required. In this scheme of things, forests in the Global South seemed to be ideal candidates.

Mobilizing data from across the world, anthropologists and geographers demonstrate that the practice of market-based conservation in the forestry sector and, by extension, the financialization of climate-change mitigation fails the rhetoric of freewheeling markets. Schemes appear less as latest forms of enclosure and financialization—as critics warn (see e.g., Bidwai, 2010; Büscher et al., 2014; Fletcher et al., 2016)—and more as hybridizing encounters where neoliberal doctrine gets diluted and financializing instruments harnessed by actors with very different agendas. How does this work? The establishment of carbon stocks in the so-called developing world takes up on longstanding bilateral cooperation between the forest sector and the development agencies, and harnesses state forest institutions' long-standing expertise in quantifying standing forest stocks (McElwee, 2016). State actors on their end have frequently used instruments and logistics of carbon forestry to roll out poverty alleviation programs. In other words, carbon forestry drives appear not so much a sphere of pure market transactions,

but rather result-based distributions that are deeply entangled with state projects (Shapiro-Garza, 2013). Taking up from here, anthropologists and geographers have shown that market-based conservation is bound up in a conundrum of divergent trajectories of generating and articulating value (Dalsgaard, 2016; Dalsgaard & Pedersen, 2015) and that people on the ground may take advantage of experimental implementation processes instead of merely finding themselves displaced (Van Hecken et al., 2018). In this perspective, the economization of forests in neoliberal terms appears as a fragile project, counterbalanced and partly undone by agency-wielding actors on all levels. To think market-based conservation projects as not necessarily culminating in the dispossession of marginalized groups or the thorough financialization of natural resources, but rather as open-ended endeavours subject to the manoeuvring of differently situated actors following their own agendas, might have particular salience in a state like Himachal Pradesh. Home to a strong civil society and a comparatively vast state bureaucracy to which a majority of people enjoys personal relations or access, wholesale dispossession is less likely to occur than in many other parts of the Global South.[2]

But even while terms such as 'emergence', 'experimentation' or 'rendering things economic' signal contingencies, carbon forestry's temporal dimensions remain little understood. In this article, I contribute to this debate by analysing temporal trajectories at play in India's first fully implemented, large scale carbon forestry project. I disentangle three ways of seeing emerging forest patches. I show that people involved as custodians of carbon forestry patches on the ground relate to the plantation by emphasizing rhythms of the developmental state: after a period of some activity the state is perceived as backing out. Embodying the second take, state-level officials envision carbon forestry patches to be relevant and standing for a few decades to come. Drawing on contractual obligations underpinning this carbon forestry project, they envision dedicated plantations to be quantified and remunerated for quite some time in the future. The framework of climate change mitigation initiatives within which carbon forestry routines operate—the third take—include the forest as perennially standing and as permanent reduction of greenhouse gases in the atmosphere, thus inscribing temporal visions of permanence.

Unpacking and situating these three ways of seeing a forest in time, I argue that in carbon forestry different trajectories of economization appear to be in tension with one another. Economization and, by extension, market-based conservation, I argue, is neither a unified project nor does it only see successes or failures and the displacement of rights or their empowerment. Instead, market-based conservation appears as hybridized form whose articulations differ not only between localities and institutions but also in time. Being attuned to temporal envisioning and shifts in time thus allows to formulate critiques of actual implementations as well as of larger frameworks employed.

My article proceeds in four steps. I begin by situating carbon forestry in India as I detail its arrival in the hills. Next, I rely on a classic methodological handle of political anthropology and follow herds and herdsmen in order to outline the withering of carbon forestry. In the subsequent section, I engage temporal envisioning among high-ranking forest department officials. In the fourth and final substantial

section, I scrutinize temporalities at play in the way how overarching climate change mitigations frameworks deals with forest patches.

The Arrival of Carbon Forestry

One day a few years ago field staff employed by the State Forest Department made their way to Bhekhli.[3] This was not a surprise visit to the village, but one that had been quite long in the making. The World Bank had made sure that a carbon forestry subproject, following the procedures of the Clean Development Mechanism (CDM) (Bryant et al., 2015; Ghosh, 2013) was included into the latest major development project the Bank financed in Himachal Pradesh. As a result, Forest Department staff had been entrusted with implementing afforestation projects in several of the state's valleys. Consulting maps, glancing through statistics and reaching out to local contacts, the foresters had decided on suitable sites. In order to qualify, they had to meet a long list of criteria, I was told. First, there was the overall imperative of the project to reach out and to deliver development to vulnerable segments of societies. Then, there were the requirements of carbon forestry in its Indian iteration. Rules required that only plots were eligible that had a tree density below 15%, that were barren since at least 1983 and were of a minimum size of 0.05ha (MHWDP, 2010). In addition, and well below official protocol, bureaucrats were looking for project sites that were still quite well connected by road. And while the regulations enabled including private, community and state-owned lands, the vast majority turned out to be state-owned plots on rather remote slopes.

When one aspiring village leader heard rumours about a new afforestation project, which he rightly took to be an access to this and cascading further benefits associated with state welfare projects, he made sure to have his villages included on the list of possible project sites. And, indeed, Bhekhli fit the bill. It had open, denuded tracts in its vicinity, was part of a cluster of villages considered most backward in the area and had not seen much development activity in the recent past. Situated at the uppermost reaches of the steep mountains framing Kullu valley, it sits some 600 meters above the urbanizing valley floor and a world apart, or so it seems, from the bustle of the ever-increasing number of honeymooners flocking to this Switzerland of India. With very few exceptions, its residents are engaged in horticulture, agriculture and livestock rearing and depend on the forest as an everyday resource. When forest department staff finally reached out to the aspiring leader by phone, he quickly set up a meeting in the village as requested.

During the meeting, the staffers introduced their plans. A section of the formally state-owned land uphill from the village had been selected for reforestation. Villagers knew the area well. To them it was an open-access pasture close by, a *phag*, frequented by villagers to graze their livestock or to collect fodder and a point of call for shepherds driving herds towards summer pastures high in the mountains. Staffers laid out that on almost the whole of the pasture, on some 54 ha, a new forest would rise. They mentioned that this was part of a bigger project, aiming at reforesting similar plots dotting the hills. The forest above Bhekhli would be one of the biggest, most plots targeted by the project being half that size or less.

It became clear quickly that the forest department had not made it into the remote village only to distribute information about the new afforestation drive or to enlist support. What they were after was above all to create a dedicated user group (UG) and to convince as many villagers as possible to join it. Carbon forestry is built around the approach of 'Payments for Ecosystem Services'. To proponents of this approach nature provides ecosystem services and people who guarantee the unhindered provision of these ecosystem services, or their enhancement, should receive remuneration for that (Wunder, 2007). Steeped in neoliberal thought, proponents claim that there is a market for ecosystem services and because intact natures attract the best price on that market, it is in the best interest of people to conserve the environments they manage. Finance thus becomes the arbiter of environmental conservation (Robertson, 2012) and of poverty alleviation as it provides income to managers on the ground.

Obviously, the whole story depends on a direct involvement of individual resource users. Villagers living close to forests need to be involved both as managers on the ground and as beneficiaries of payments for the service they, and 'their' ecosystems, provide. According to proponents of PES, only such a tight involvement will make conservation work and help people to ease poverty (Shapiro-Garza, 2013). While vice versa the financialization of environmental conservation and poverty alleviation came to be bound up with distinct socialities, the UGs.

During the meeting, *forestwalloh*—the generic term for forest department staff—made clear that the UG was to have a number of roles and functions. It would feature as collective entity entrusted with maintaining the planted saplings and ensuring that they would grow into a proper forest. The UG also would become the custodian of the land selected as carbon forestry plot. Finally, the UG was to be the collective entity eventually receiving money as a way of compensating for their service. That the money was raised on proto-market established by international institutions and that it was framed as a direct equivalence to the exact amount of CO_2 sequestered was lost on the villagers. What stuck was that the amounts of payments were dependent upon the health of the envisioned forest: its very existence and the exact amount of biomass.

It took the field staff a while to convince villagers to form a UG and join as members. After all, the work was hard, earnings low and cash-outs postponed into a distant future and fundamentally uncertain. On the other hand, investments by villagers were negligible and the risks manageable. And many thought it advisable to at least benefit from a project that blocked access to one of their pasture and to use participation in this afforestation drive as a means to secure additional material benefits of the umbrella project, such as seeds, fertilizer and satellite dishes at subsidized costs or infrastructure development more generally. At the same time, the afforestation projects did not seem to be much of a nuisance. There are other pastures nearby and by virtue of the plot's limited size and its position quite far up the mountain, the afforestation efforts would not block their access to forests for fodder or fuel wood.

Eventually, therefore, a number of villagers joined the group. Given that the village is populated by high caste families, members belonged to this stratum. Furthermore, most members were women, reflecting both the project's stated aim

to reach out to women and the gendered quality of forest work in these parts. That is, women by virtue of being charged with grazing animals and sourcing fodder in the woods, appear ideally qualified to monitor and care for the emerging patch with little extra efforts.

Not long after the meeting, the forest department kickstarted the establishment of the plantation. Trucks delivered barbed wire needed for fencing the afforestation plot. I have analysed the politics of establishing carbon sinks in detail elsewhere, arguing that carbon forestry involves processes of enclaving that carve out dedicated plots and subject them to governance routines answering to the demands of global carbon trading to the detriment of local resource use practices (Harms, 2018). More than signalling another development project, the fence appeared vital for sealing off the plot and keeping livestock and most people out. As virtually all other forestry related projects in the region, this one too operates on the premise that grazing animals are the biggest threat to forests in these rather densely populated, predominantly agrarian hills.

Garam Chand, one of my interlocutors, joined force both as a daily labourer hauling barbed wire and, later, seedlings up the hill to the dedicated slope. And eventually he took on the role of village watchman in charge of monitoring the plantation and, theoretically, registering and fining trespassing or misuse. As a shepherd moving herds up to and along the slopes above the village since many years, he had a fine knowledge of the forest. Furthermore, he could use an extra income.

Goats in the Carbon Orchard

Ten years later, when summer set in, Garam Chand began preparing for the yearly trek. Putting on his shepherd hat, he engaged negotiations in his and neighbouring villages. Decisions were due, whose animals to take along with them and how much he and his colleague would earn for their service of feeding and guarding the animals on summer pastures high in the mountains. Apart from the usual quarrels about payments, they encountered little surprises. After all, they had taken care of grazing animals fattening on high pastures during summers for a very long time. They knew routes by heart, including reliable and safe pathways and, most importantly, pastures to feed the herd all along the way. This year, the situation was more comfortable. After a long hiatus, they could again use the customary pasture located right above the village again as first stop on their journey.

For years, they had circumvented this pasture, leaving the rich grass growing in this terrain aside and driving animals along the outer perimeter into the forest on the other side of the hill. To stay clear of the pasture was easy. The massive barbwire fence had kept livestock out for the benefit of the new tree plantation.

This year, however, the fences had not been overhauled, poles that had collapsed under snow and ice were not renewed. Some of the barbwire had already been collected by villagers and put to new use as fence for vegetable gardens around houses or as means to fix and enforce old apple trees. Substantial amounts of the barbwire, however, was still up there, signalling the parameters of the afforestation plot. In a few places, a fence was still recognizable that now had lost

much of its significance. In other places, the barbwire had fallen to ground as poles collapsed under snow and ice in winter. As the herd approached the pasture, this year they simply crossed what was left of the fence and entered the afforestation plot. They made camp much closer to the village then they were forced to do over the last couple of years, overlooking the deep valley and letting their herd feast on whatever they found as they had done for decades. As in so many summers before the announcement of afforestation efforts on this particular slope, the animals would benefit from the abundant grasses on this well-watered and sunny meadow. Likewise, the herdsmen were looking forward to enjoy the sun on this open field, keeping them warm after cold nights.

When Garam Chand decided to drive the herd up to the customary pasture, nobody protested. Over tea he told me that the trees were now tall enough and that the goats, sheep and cows would avoid them for the bitter taste the leaves had acquired now that they were 1.5 m tall. For quite a large number of trees this was true. An equally large number of the trees, however, those planted on the highest reaches of the slope, were still tiny. Naturally, the herd feasted on them. For all practical purposes, the young fragile trees growing in the plantation ceased being subjected to specific forms of care grounded in the procedures of carbon forestry, such as regulating access of grazing animals and axe-wielding humans, replacing dead seedlings or improving forests by way, say, of fostering drainage. Put differently, the idea of a plantation ceased to matter for villagers, readily returning to the old ways of using the plot. Elsewhere I have accounted for claims to territoriality and ownership surrounding this plantation as a way to explore market-based conservation in practice (Harms, 2018). Here I turn to temporal dimensions and future envisioning in order to engage tensions and contradictions inherent in carbon forestry, demonstrating the contingent nature of economizing of environmental services and of subjecting them to dedicated financial instruments.

The decrepit fence was not the only sign telling of the renewed accessibility of the terrain. The signpost advertising the type of work, funding agencies and project duration—an indispensable part of development projects in India—had broken down earlier and what was left of it now served as a wall reinforcement at the house of one group leader. Assessors had not shown up for a long while, nor were there rumours of a new visit. Closer to home, Gharam Chand's tenure as elected watchman charged with monitoring and enforcing specific rules for the plantation had come to an end without a replacement. In a way, both forms of fencing—the sharp material barrier and the seemingly softer one effected by monitoring—vanished together. In the village, Shekhar Singh and many other villagers told me that villagers were proud of the work they had done, proud of having made sure that the young trees flourished, beginning to give the once denuded slope the shape of an emerging forest. Obviously, the funding seemed to dry up and there were rumours about the termination of the overall project, and narratives of having completed afforestation only fed into a sense of closure.

Finally, the first round of funds he and his fellow villagers had earned through carbon forestry had been distributed to the UGs' collective bank account. The cash out roughly coincided with the realization that the project was about to terminate, reinforcing the impression.

This was a moment of dispersal rather than one of completion. The project is over, Gharam Chand said and what the future held for the planted patch of trees and if further state development projects would come their way was mired in uncertainty. To Garam Chand, the termination of the project signalled the return to another, foregoing form of using the slope. To him, it ceased to be forest that was to be maintained and monitored. It shifted back to being a pasture and thus the arena and object of an economic strategy that had held him and his family above water for generations, shepherding. The moment the project terminated meant thus not the wholesale failure of afforestation drive. The results were more modest. The dismantling of the project triggered undoing the economization of the forest as carbon sink. Now, some of this is all too familiar: Plantations being abandoned after the completion of project lifecycles, leaving behind 'paper forests' with little beneficial impacts for landscapes and populations, are well known in the annals of South Asian afforestation policy. Yet, carbon forestry involves more than simply bringing back woods, it involves providing access to the remuneration for servicing arboreal sinks, which is seriously hampered once the state appears opting out.

The field of Indian forest governance is notorious for its paper truths and carbon forestry certainly adds further paper forests to the conundrum (see e.g., Kashwan, 2017; Vasan, 2006). Afforestation drives have shown to be non-starters and achievement wildly overexaggerated by way of tweaking with survival rates of trees and plantations or by registering forests as sinks in places where there are none (Haapanen, 2014). A concern for temporality attuned to what I would describe as the withering of carbon forestry speaks to these claims. Below the wholesale failing of afforestation drives, a dismantling of projects evident by diversions of funds or state attention elsewhere may involve—as my fieldwork data demonstrates—shifts in local resource use practices. Plots are re-appropriated once the state appears to back out, when they are opened up again for grazing herds or other uses. I am not suggesting that this amounts to the return to a pre-project state. It rather appears to be a moment of contingency, where parts of the plantation survive and may grow into a proper forest eventually and where some people may have secured tighter relations towards the local state. Considerable numbers of trees, however, do not survive this withering of the project. People, on the other hand, are drawn into and released from such projects as they wax and wane. Exploring the effects of carbon forestry or market-based conservation projects on the hearts and minds of involved villagers in detail is beyond the scope of this article. Suffice to say for now that Garam Chand's faring in the project illustrates well that the widely critiqued dimension of integrating resource users into global markets and the hollowing out of environmental relations towards the quantifiable by way of financial instruments remains of limited salience in this Himalayan valley. Earnings came largely framed in the language of state-based poverty alleviation, and not as remunerations reaped by, say, making forests work for green traders. Garam Chand told me that what they had earned were funds the state distributed to poor villagers by paying for labour and for caring for the emerging forest. The forest patch itself came to be embedded into the ordinary, conflictive dealings with the forest department (Harms, under 2018). Looking with Garam Chand at the

plantation in a moment of what appeared to him the termination of the project, reveals the project to be a fragile, ephemeral intervention. An episode within fraught histories of forest governance, rather than a radical break and reorientation neoliberal ideology wants it to appear. In this view, the forest patch appears again as volatile and vulnerable, stripped of specific routines of care its existence was rendered uncertain again, futures being cancelled.

Funding Futures

Gharam Chand's take on the immediate future did not come out of nowhere. Throughout much of my fieldwork, the carbon forestry project was in a state of transition. During the early days of my research, the afforestation initiative was, as already noted, a component of a much larger World Bank-funded project targeting the improvement of rural livelihoods in the hills of Himachal Pradesh by implementing a broad portfolio of agroforestry related interventions, ranging from animal husbandry over irrigation to afforestation. After this umbrella project received the maximum years of extension, it was time to wrap up. Project staff were kept busy with filing final reports, packing up and auctioning off office utensils. Above this there was an air of closure. To bureaucrats and field staff this was not a troubling moment since generally they were serving in the project on deputation. Similarly, high ranking officers operating between Shimla, the regional capital, and Delhi scrambled for a new project which eventually came through. Given the long engagement of the World Bank in Himachal Pradesh, and it being a flagship state to development banks and aid organizations, the World Bank was keen on funding the next project. After all, Himachal Pradesh was a state, where, as I was told in posh metropolitan offices, development worked. According to the logic of the Bank and their point persons in the state government, however, the new project was supposed to work with people and areas not yet reached out to. Turning, ideally, to novel sites meant diverting funds and attention elsewhere, deepening the sense of closure.

The new project again targets rural livelihoods at the intersection of agrarian and forestry sectors. But with funding secured, the carbon forestry segment remained in limbo for a long time. High ranking officers were themselves uncertain what form it would take and where it would be placed. In this uncertain state, activities on the ground were halted. That being said, in higher echelons the continued existence of the carbon forestry project was never up for debate. Official agreements, project designs and earmarked funds forbade that, while, on the other side, the World Bank regularly repeated its commitment to invest into and back carbon trade, heading a number of project streams and institution, such as the Carbon Pricing Leadership Coalition[4]. In order to unpack this figuration and to relate it to temporal envisioning and economization I now turn to official documents and the timeframes they lay out. They embody, I argue, the envisioning of forests for years and decades.

Over tea, Mr. Sharma explains the temporal structure of the measurement efforts that form a pinnacle of this carbon forestry project. Echoing project

descriptions market (MHWDP, 2010), he tells me that the project runs by credit periods of four years each, one following after the other. A forester and high-ranking officer, sitting in the project's head-office and overseeing operations from here, he explains the logic of credit periods by tying two intersecting rhythms to one another. The four-year gap is necessary so that the growth of trees and there-fore the accretion of carbon dioxide in biomass can be measured. In order to have as much as possible to report, he tells me, audits take place after the monsoon, which is the major growth period. The four-year gap is also attuned to the cycles and rhythms of the global carbon market, where four year periods are common, he maintains. Cyclicity is a key element to their undertaking. But do they run in per-petuity and how do they end? And what are the implications against the backdrop of the lifecycle of trees or and forests and against the background of climate change mitigation efforts?

In a CDM framework, carbon forestry involves payments to resource users remunerating for their service of allowing biomass to accumulate—in contrast to the REDD or REDD+ framework where remunerations are thought to recom-pense for abstaining from diverting standing biomass into, say, logged woods or burnt forests (Benabou, 2021; Paladino & Fiske, 2016). Temporal cycles are meant to enable measuring, interpolating and remunerating the service of enshrin-ing CO_2 into biomass as it is allowed to grow unhindered. Project staff walked me through it. Thus, the rulebook demands the arrival of assessors on afforestation plots every 4 years in order to assess plots and quantify biomass as precisely as possible. The biomass found is, second, to be contrasted to what had been found during the preceding round, allowing to extrapolate the services of any given crediting period, that is, the actual sequestration of carbon dioxide. Third, the CO_2 found to be enshrined on a given plot within the given four-year period is as a service translated into funds earned.

Overall, carbon forestry in Himachal Pradesh is meant to flush certificates of emission reduction (CER) into a nascent market, thus bolstering market-making activities by providing for things to be traded. In order to safeguard supply also during periods of limited demand, and thus to attract institutions by hedging risks, the World Bank fixed prices for CERs produced by this project irrespective of actual costs at a global market. Costs for CER were set at the rate of 4.5US$, and the exchange rate of US Dollar to Indian Rupees at 1US$:60INR, thus ensuing further income for the Indian state acting as a middleman.

This figuration lends itself to an analysis of market-making at the hand of state and supra-state entities, governed by planning rather than by naked supply and demand. It also invites a reflection on the temporal envisioning. As is well known, the CER market imploded following the 2009 Copenhagen rapport, and much of scholarly and policy attention has since been diverted. Yet, CDM contracts and commitments remain in place providing for a shadow presence and bailed out futures for CER and paper forests produced by this and related projects. Not for-ever, though, but rather within limited timespans. Again, documents are clear and funds in place. During fieldwork, staffers were adamant that CERs are to be produced for 60 years in 4-year cycles, irrespective of prospective buyers or actual sales. Afterwards, the forest will return being the sole property of the Forest

Department and UGs, just like the one Gharam Chand worked in, losing all rights to it as a marketable resource. It will go back to the Forest Department, foresters told me, and the department will deal with it as it sees fit.

Committed to decades of uninterrupted crediting cycles, this Indian avatar of carbon forestry sits awkwardly between usually rather short project cycles characterizing development policies, on one hand, and lasting changes or permanent transformations called for in order to combat climate change, on the other. While its long overall projected life cycle of sixty years arguably speaks to the extended time spans within which forest growth takes place, it does not and cannot account for a permanent reshuffling of resource use. The temporal framing remains limited.

Projects such as this may, of course, be seen as catalysators heralding in a permanent reorganization of forests as service providers marketable through specific certificates, once and for all 'turn[ing] it into a commodity detached from personal relationships and clear conscience but commensurate with other carbon-emitting actions' (Dalsgaard, 2013). But in practice, the more prosaic schemes of funding commitments and project operationalizations instantiate an economization of dedicated forests for a limited number of decades. In so doing, they articulate a temporal envisioning different from, both, target populations on the ground and the logic of climate change mitigation. To the latter temporal framing I turn now.

A Permanent Sink

Growing trees on this specific plot above his village, wove Gharam Chand and his fellow villagers loosely into global procedures of climate change mitigation. What they did and how 'their' trees grow, henceforth counts as compensation for excess emissions elsewhere. In order to achieve this, carbon trade procedures rely on the idea that emissions in one place and time are fundamentally commensurable with sequestrations in others. Researchers across social and environmental sciences criticize the idea of commensurability in environmental management, arguing that this operation involves thinning out of much of the complexity of ecosystems as it reduces them to a small set of quantifiable traits or prioritizes specific features at the expense of a myriad others that make up any ecosystem (Castree & Henderson, 2014; Dalsgaard, 2013; Engels & Wang, 2018; Milne & Mahanty, 2018). Concurring with these critiques, here I call attention to the timeframes embodied in these procedures.

Carbon forestry in its Indian avatar embraces some of the complexity of forest ecosystems. National bodies comprising biologists and foresters authorized rather intricate calculation procedures mandatory to quantify the CO_2 sequestration of plants or forest parcels. Calculations procedures distinguish between types of growth in a given forest parcel—that is, between trees, shrubs and grasses. Of these, trees and shrubs receive most attention. Drawing on field data generated by trained assessors, algorithms quantify carbon stocks according to species, height, soil type, elevation and climatic condition found on a given plot. With respect to grasses found on a given plot, assessors are required to estimate the aggregate biomass from which calculation procedures extrapolate CO_2 stocks, again taking soil type, elevation and climatic conditions into consideration.

In the valleys I am concerned with here, the procedures of carbon forestry require assessors to assemble the whole project's carbon stock by accumulating data from sample plots spread ideally across all carbon forestry plots and extrapolating totals. Next, assessors determine the CO_2 sequestered in the current crediting period by subtracting stocks determined in the preceding crediting period from totals of the current one. Jotting down species type, tree heights or biomass estimations, and running them through algorithms churning out numbers, assessors engage in what STS scholars frame as acts of inscription: facts are made through science-based inscription devices and authorized routines (Latour & Woolgar, 2013; Lippert, 2015). These are partial knowledges, driven by specific socially mediated approaches and techniques overshadowing other ways of knowing, say, trees (Haraway, 1988). And these are ways of enacting carbon dioxide in a specific form—sequestered from the atmosphere and enshrined into arboreal containers, on one hand, and available for offsetting schemes as a numerical value, on the other hand.

I am not concerned here with the facticity of actual plantations nor with the accuracy of measurement routines. I rather call attention to the fact that such quantification routines do enact forests as perpetual carbon sinks. Excel sheets—produced and circulated by consultants, mobilized as proof of the project's efficacy in discussions with the odd anthropologist and underpinning the data presented in official reports—list absolute accretions of CO_2 in forest containers, and imbue them with a sense of permanence. 'This is how much we have offset,' one staffer tells me bent over the screen showing the near ready data sheet of the latest audit cycle, referring to an accomplishment that the notion of offset renders permanent.

Not only in development policies and governance, numbers enjoy a life of their own. Numbers create a sense of facticity and realness. They may be corrected in order to account for mistakes or to inscribe shifted realities—even if once reported numbers in the worlds of development practice rather gather dust than being put to critically re-evaluation and correction (see e.g., Merry, 2016; Rottenburg, 2009). The creation of a sense of perpetuity by quantification routines I am signalling here, builds on the general seduction of numbers by using numerical abstracts as commodities. Crediting—the practice of counting, converting and adding up that culminates in tradeable CERs—renders a snapshot in time a marketable product. Towards the end of an assessment process, a numerical value is produced and carbon stocks rendered an 'immutable mobile', albeit one of another order than what Bruno Latour had originally in mind when coining the term (Latour, 1990). To Latour, scientific output such as graphs are immutable mobiles. Graphs or tables, argues Latour, appear as condensation of research practices that are ready to be passed on between expert meetings, media outlets and scientific populations. Think of the famous Hockey Stick Curve, for instance, galvanizing attention to the reality of Global Warming. Literally travelling the world, the curve remained the same and began to wield power of its own.

CERs are mobile and immutable in a slightly different way. Once produced, CERs referring to carbon stocks can be circulated among traders and amassed by polluters to make up, or so the narrative goes, for their own emissions by way of

paying others for the service of sequestering emission. The act of emission reduction builds on the assumption that that what the CER stands for—the carbon stock—stays the same throughout. It is mobile as it is floated among traders, yet treated as an immutable signifying a permanent feature.

Critically, CERs embody a claim on time. The crediting scheme renders both the emission and the emission reduction permanent features. Emissions from fossil fuel clearly are permanent by the reckoning of human time frames: CO_2 ousted by combustion will remain within carbon cycles for millennia. Emissions reductions, however, are not. Critical geographers and allies have warned that CER schemes targeting avoided emissions, such as clean cooking energy drives or REDD+, are exercises in speculation where financial operations mute contingent development trajectories, including possible rebound effects, and foreground certainly seductive permanent reductions (Bryant et al., 2015; Dalsgaard, 2016; Müller, 2017; Wang & Corson, 2015). Afforestation drives, on the other hand, skew temporal dimensions by writing the very existence of specific carbon stocks into the future. Since afforestation CERs can be used to permanently offset emissions, they imply the perpetual existence of respective carbon stock in the desired immobilized, non-gaseous form. Following the logic of commensurability between emissions and sequestration mediated by CERs, forests are rendered of the same temporal order as emissions: as permanent features. In other words, the procedures of climate change mitigation render the forest that Gharam Chand helped to bring up, and which he sees partly dismantling and returning to a pasture, still a stable feat.

Looking at the plantation in this moment of project dispersal situated in the long aftermath of an imploded, yet not entirely forsaken involuntary carbon market reveals, furthermore, the contingent nature of economization. A robust scholarship demonstrates that, on one hand, states play a prominent if not the key role in the emergence of markets and in processes rendering things or services economic (see e.g., Çalışkan & Callon, 2009; Murphy, 2017). On the other hand, it demonstrates that economization is in itself an often rather fragile achievement in need of protection and scaffolding in order to hold non-capitalist economical forms at bay (Polanyi, 2014; Wright, 2010). Carbon forestry patches on these slopes clearly demonstrate the involvement of state institutions on all levels of rendering forests and services marketable commodities. State and suprastate institutions were driving forces of carbon forestry and state actors implemented this proto-market segment, from senior bureaucrats negotiating with the World Bank all the way down to street level bureaucrats mobilizing support in villages.

More importantly, however, with the carbon market a non-starter, yet funding earmarked for altogether sixty years and the hope for market-based solutions to climate change never buried, the carbon forestry plot ended up being something of a lingering presence, one of neoliberalism's ghosts haunting the future. By this I do not simply mean to imply that the economization of forests and their services turned uncertain. Nor that promises remain potentially unredeemed at a moment when it is uncertain whether assessors will return for another round of quantifications or if the funds promised for another crediting period will shore up in their bank accounts. I want to emphasize instead that the forest itself appears of a

ghostlike quality. Partly growing, partly undone by grazing animals feeding on low growth and chronically threatened by failing rains, fires and axes, the forest patch remains a vulnerable and volatile feat. Now, this resonates with many a development project left unfinished or unstarted as funding priorities went elsewhere or project cycles had worn off (see e.g., Carse & Kneas, 2019; Howe et al., 2016). While roads or bridge never built may gain a shadowy hold on the future, the volatility of forest sinks enacted as permanent sinks calls forth peculiar ghosts. Forests might get destroyed at any moment and, below complete annihilation, the documented carbon stock may be partly undone by human or non-human actors, unravelling sequestrations and returning greenhouse gases into the atmosphere. As a neatly documented forest, known and traded in the form of CERs carrying their own truths, however, the forest patch continues to feature as a potential ghost in the registries of global, national or provincial climate change mitigation achievements. Following Derrida's (1994) footsteps, scholars across the social sciences and humanities attend to the ongoing presence of the past in the form of ruins, lingering traces and present absences (Bille et al., 2010; Stoler, 2013). If much of such an hauntology is attuned to how the past haunts the present, the forest patch rather appears to be a ghostly claim on a rather distant future, a fundamentally unredeemable claim on permanence in a quickly shifting landscape that enjoys immortality in the form of number and certificates.

Conclusion

In this article, I have uncovered three ways of seeing carbon forestry patches in time, arguing that temporal envisioning embodied by differently situated actors and institutions helps to account for the faring of green neoliberalism on the ground. The temporal arcs articulated by global climate change mitigation efforts in the guise of carbon trading enact forests, as I have shown, as perennially standing stocks, which stands in tension most markedly with the sense of withdrawal and partial dismantling of the carbon forestry project among, what is being called, target populations in rural villages. This, of course, is not to say that carbon forestry monocultures are soon to vanish or that the continued existence of forest sinks depends on monitoring by state agencies. It rather is meant to say that the prism of temporality brings into relief contradictions within carbon forestry itself and indicates the limited reach of green neoliberalism on the ground. The tensions between assumed permanence and the actual ground realities of volatile and vulnerable ecosystems have not gone unnoticed. In fact, proponents of emission trade are increasingly wary of forest carbon projects for being risky, leaky and complex. Yet, forests remain prominent in strategic climate change mitigation outlooks and forest carbon continues to feature as ghostly presences in the registers of past and ongoing certified emission trade.

Both, the withering of projects and the partly dismantling of plantations also clearly indicates the implication of market-based conservation into the ordinary workings of state welfare, providing a healthy reminder of neoliberalism's constrains. With projects seen to being completed, not only does care and monitoring of individual forest come to an end. The reforming of slopes and minds according

to neoliberal ideals of improvement, (self)reform and market rule supposedly incentivized by results-based payments meet an uncertain future.

These project-specific uncertainties add onto rather normalized uncertainties concerning the nature of state development projects, which people know to come and go according to their own timelines and rather opaque decisions made by inaccessible bureaucrats. Temporality is writ large in the worlds of contemporary development policies or in nature conservation. Virtually all projects come with their own timelines, project cycles and biographies (Allen, 2018; Rottenburg, 2009). Yet projects are designed so as to create lasting changes. Looking at the plantation through the prism of officially sanctioned routines of quantification and the way these routines are made sense of among target populations reveals the fragility of economization efforts. Services or biomass accretions remain supposedly marketable goods for fleeting periods of time, with their overall trajectory uncertain as they oscillate between commodity, object of state care and merely ordinary trees that ceased to be eligible for monitoring and care on the side of villagers.

Temporality thus appears to be a suitable lens to investigate how real existing neoliberalism intersects with ordinary lives and to analyse the doing and undoing of economization on the conservation frontier.

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Notes

1. My analysis draws on ethnographic fieldwork pursued between 2016 and 2019, employing participant observation, structured and narrative interviews and everyday conservations.

2. I thank the reviewer for reminding me of Himachal Pradesh's specific place in the landscape of dispossession.
3. All names of persons and places are pseudonyms.
4. https://www.carbonpricingleadership.org/ (last accessed 3 November 2020).

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