

# ACCEPTED VERSION

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**Slow infrastructures in times of crisis: unworking speed and convenience**

Postcolonial Studies: culture, politics, economy, 2021; 24(2):212-233

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<http://dx.doi.org/10.1080/13688790.2020.1804105>

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**1 December 2022**

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## Slow infrastructures in times of crisis: unworking speed and convenience

### Abstract

The (post)colonial logics of speed and convenience are manifest in many of today's infrastructural projects, creating what we consider to be 'fast infrastructures'. These infrastructures create ease for some and harm for others while exacerbating social and environmental crises around the world. Addressing these crises requires, we argue, a slowing down. Enter the role of 'slow infrastructures'. In this paper, we highlight two forms of slow infrastructure that provide possibilities for rearranging our infrastructural orientations: composting and rainwater harvesting. Drawing on fieldwork conducted throughout 2018 and 2019 in Kochi, Kerala, this research asserts that in order to do infrastructure differently, an unworking of convenience and speed is required. This unworking can be achieved through an attunement to multi-species and non-human relations, matched with a distributed ethic of maintenance and care. Our ethnographic examples, one from a hospital and another from a hotel, suggest that slow infrastructures can meaningfully offset the threat of disfunction and 'urban failure' that confronts cities increasingly marked by turbulence and uncertainty. While these examples draw from the tropics of urban South India, they offer lessons helpful to unworking the harm caused by fast infrastructures in other parts of the globe.

**Keywords:** infrastructure, crisis, speed, convenience, [developmentcare](#), India.

~~‘Infrastructure is sunk into and inside of other structures, social arrangements, and technologies’—Susan Leigh Star, 1999<sup>1</sup>~~

Many of the environmental crises the planet faces have origins in colonial and capitalist logics of speed and convenience. And for most of the world’s population, the crises that began with settler colonialism have deepened and accelerated on the heels of the industrial revolution and, more recently, the impacts of neoliberal capitalism.<sup>2</sup> These dispositions are now worked into the rhythms of human and more-than-human lives and have fueled a petromodernity<sup>3</sup> that sees land, water and energy rendered as resources to be extracted, used and disposed of with little regard for flow-on effects. Physical infrastructures such as roads, container vessels, dams, and sewers, create the logistics of that project, built on the premise of progressionist linear time, and endless growth. These infrastructures are generally built quickly – using cheap labour and cheap energy – with the aim of moving people and goods quickly<sup>4</sup>. Convenient for a few, and increasingly harmful to many, they constitute fast infrastructures.

Due to their problematic nature, we contend that fast infrastructures require an ‘unworking’ to be more equitable and ecological – an unworking that requires revisions of the predominant orientation towards speed, convenience, and endless growth. Such an unworking might involve a slowing down, and a turn towards slow(er) infrastructures. These slower infrastructures can offset the threat of disfunction and ‘urban failure’ that confronts cities increasingly marked by turbulence and uncertainty.<sup>5</sup>

In this article, we ~~offer-present~~ two examples of viable slow infrastructures that ‘offer a material ethics at the immediate scale’<sup>6</sup>: composting and rainwater harvesting. We suggest that these practices hold particular promise for the more equitable distribution of resources

and power in places such as (post)colonial India<sup>7</sup>. We do so with the recognition that these processes and practices are deeply situated in the social and environmental fabric of India and may not work everywhere for everyone. And while there are key conceptual insights to be elicited from the promise of slow infrastructures, we draw these out by grounding the discussion in examples from a collective thirteen and a half months of fieldwork from 2018-2019 that was conducted in a South Indian city known as Kochi throughout 2018 and 2019. Situated in coastal Kerala on the Malabar coast of Kerala, this burgeoning metropolis faces overlapping environmental challenges that replicate and reflect the problems of fast infrastructures in other parts of India, and in other (post)colonial cities undergoing rapid change. In what follows, we highlight the scope of these challenges in Kochi while also featuring lessons gained from repeat site visits at locations where slow infrastructures are being maintained to a considerable degree of success.

This work engages the insights and appeals selected from over one hundred key interlocutors who shared their motivations for building slow(er) infrastructures via interviews, focus groups, site visits, participant observation, and collaborative efforts to promote environmentally sound practice in Kochi. The initial networks we built in Kochi were forged through our institutional affiliations to Amrita Vishwa Vidyapeetham University, and particularly the waste management initiatives on the various campuses of that institution. These initial networks were then expanded upon to include environmental activists working throughout the city, with whom we undertook collaborative learning of environmental and sustainability initiatives by way of participant observation. The initial networks we built in Kochi were forged through our institutional affiliations to Amrita Vishwa Vidyapeetham University, particularly the waste management initiatives on the various campuses of those institutions. These initial networks were then expanded upon to include environmental

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~~with the slow infrastructures, we provide an alternative narrative to the slow violence that fast infrastructures often entail.<sup>8</sup>~~

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engaging with slow infrastructures, we provide an alternative narrative to the slow violence that fast infrastructures often entail.<sup>8</sup>

Over the last two decades, many social scientists have been turning to infrastructures as a way of investigating the ‘flow of goods, people, or ideas’ across space and time<sup>9</sup>. ~~Framed as such, i~~~~These infrastructures, which have their history in large public works such as the Paris sSewers, and the Indian railways, and the Panama and Suez Canals.<sup>10</sup>~~ ~~A key insight from this literature, is that~~~~More recent analysis contends that~~ infrastructures are more than matter that moves other matter, they are processes ‘embedded in and constitutive of social relations’<sup>11</sup>. ~~This extends from the formative instances of urban infrastructure such as the Paris sewers~~ ~~The earliest forms of infrastructure.~~ ~~These infrastructural relations often occur y~~ ~~constitute relations~~ between ~~citizens~~ ~~the public~~ and the state, ~~the public and the private, that,~~ rearrangeing relationships between humans and the materials that make their lives possible. In this way, infrastructures ‘create a process by which the body, as much as the mind, apprehends what it is to be modern, mutable, and progressive.’<sup>12</sup> ~~As such, Yet, as these infrastructures promise speed, connection, progress and prosperity, they also infrastructures often~~ trap citizens in highly centralised and increasingly privatised uneven systems of capital accumulation and resource distribution. ~~We aim to advance these conversations around the social and (dis)connections~~ ~~contradiction~~ ~~temporal~~ ~~that~~ ~~nature of infrastructures~~ ~~make~~ ~~by~~ ~~while~~ ~~by~~ ~~bringing ethnographically derived insights about~~ ~~of slow infrastructures into~~ conversation with scholars working oen ~~postcolonial theory~~ ~~feminist science and technology studies and postcolonial theory.~~ ~~A further~~ ~~The~~ ~~To this end, we~~ ~~A further aim is to~~ ~~aim is to in~~ ~~ways that~~ highlight how speed and convenience are both embedded in the fabric of the ~~(post)colonial city, and being unworked through slow infrastructures.:~~

To ground ~~our~~the discussion and its insights, we situate both fast and slow infrastructures in (post)colonial Kochi, providing evidence to suggest how the Keralayan city has been transformed through colonial expansions and large infrastructural projects in the name of economic growth. This helps to explain how progressive states such as Kerala – heralded as a model for international development on the basis of access to health and education – nevertheless continue to struggle with the ~~violence-contradictions~~ of economic ~~development~~ ~~growth and through~~ infrastructural ~~development~~.<sup>13</sup> We then look ethnographically at two slow infrastructures, composting and rainwater harvesting, framing them as ethical practices that work against the centralisation and privatisation of public resources and materials. We suggest they hold promise for a more ethical, and less destruction-oriented approach to infrastructures. We claim them as infrastructures due to their relational capacities between and beyond the human. By prioritising a ~~user-operated~~decentralised and distributed ethics of everyday maintenance and care, slow infrastructures involve reworking relationships ~~to~~ between fellow humans and to the more-than-human world, ~~and, in doing so, they~~while also help tounworking attitudes toward speed and convenience.

As a further prelude to what follows, we note that speed and convenience are intertwined. Indeed, convenience ‘legitimizes and sustains specific forms of (fast) consumption’.<sup>14</sup> Such accelerated forms of consumption can have the ‘paradoxical effect of fragmenting activity, inadvertently exacerbating the (everyday) sense of harriedness’ while also generating demand for yet more convenient solutions.<sup>15</sup> We also recognise, however, that convenience has both ‘good and bad’ connotations and that as a phenomenon it has ‘multiple realities depending on (the) different knowledges, spaces, circumstances and relationships’ in which it is analysed.<sup>16</sup> When it comes to convenient or fast foods, for instance, these goods offer speed in terms of

preparation and consumption, but they also create expanding waistlines, additional health concerns, and a surfeit of environmentally harmful wastes once their packaging is discarded. And, yet, when convenience is done through food it can also be ‘done through care’ by time-pressed and hardworking parents who are doing their best to keep their children fed.<sup>17</sup> So, while there is an element of ‘convenience as care’ in such an example, there is also an element of convenience as uncaring in terms of the secondary and tertiary ripple effects it can create. It is the undoing of these ripple effects that we want to take seriously by highlighting the work that can be achieved by slow infrastructures. It is also worth noting that while the slow infrastructures described below foster more equitable distributions of responsibility it is a more than human ethics of care — one that unworks convenience and speed — which is highlighted through the practice of composting and rainwater harvesting.

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### **The time of infrastructures**

Infrastructures are not as rigid as their structure-centred nomenclature might suggest. Time, maintenance, decay, and labour are attached to infrastructures because they are *processual*. As objects of ethnographic attention, they are ‘a relational space of investigation, where researchers can explore fluctuations, or trace the dynamic shape of what thrives and what dies’.<sup>18</sup> As relational entities, infrastructures are more accurately described as ‘temporary lines across active environments that erode, rust, and fracture’.<sup>19</sup> This observation places emphasis on not just the creation but also the destruction that is part of the life of infrastructure. As such, infrastructures are not just ‘a thing’; rather, they are a ‘thing-in-motion, ephemeral, shifting, elusive, decaying, degrading, becoming a ruin but for the routines of repair, replacement, and restoration (or in spite of them)’.<sup>20</sup> While new and emerging infrastructures invoke teleology, futurity, and techno-mobility, they do not

necessarily incorporate plans for their own lifecycle and ultimate demise. Nor do they, as Ara Wilson highlights, address the power differentials or the intimate injustices that these new material relations often generate<sup>21</sup>. Wilson states: ‘just as the installation of infrastructure has never been equitable, the decay of public infrastructure is not a homogeneous decay’<sup>22</sup>. In other words, new does not equal better or everlasting – and yet, that is often how the surfeit of fast infrastructures are embraced.

~~As indicated, The~~ colonial logics of extraction and capital accumulation are often wound up in infrastructural projects and their ~~associated promises of attached promised of~~ economic and social development. One of the clearest realisations of this are the ~~aforementioned~~ Indian railways, built by the British throughout the 19<sup>th</sup> century ~~as a series of public works that also served as a ‘vector of capitalist modernity’ benefitting foreign merchants and colonial rulers.~~<sup>23</sup> ~~Over time, and particularly in their contemporary use, such public works became infrastructures – following from the aforementioned definitions provided above – as they continue to significantly altered the nation’s socio-material networks and more-than-human relations in (post)colonial India. – while improving the built~~

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The ‘anticipatory good’<sup>25</sup> of infrastructure obscures the ~~ecological~~ destruction and ~~social~~ inequality accelerated by those same infrastructures.<sup>26</sup> We ~~contest-contend~~ that this anticipation is often promised under the guise of convenience and speed and that the fast infrastructures in our midst are crisis-ridden. They are crisis-ridden because they offer quick and temporary solutions to problems that have their origins in colonial logics of linear time, endless growth, and human exceptionalism.<sup>27</sup> As Hannah Appel so beautifully writes, ‘under Anthropocene skies, petro-fueled infrastructures inflate like life jackets for a regime that otherwise should have drowned in its own violence and excess’.<sup>28</sup> In their inflation, fast infrastructures create uneven relations across different scales, materials, and times. As



infrastructures continue to disperse and complicate relations to environments at increasingly problematic scales, there is a need to re-imagine our relationships to infrastructures and to re-distribute their effects in a way that prioritises reciprocal relations, ~~and multi-species flourishing.~~

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We use the heuristic of speed to suggest that slow infrastructures might be viable alternatives to the extraction-centred colonial disposition of fast infrastructures. Slow infrastructures may not increase the mobility of people or things, but instead represent a shared responsibility for putting the world back together though more ~~explicit and responsible~~ equitable distributions of maintenance and care.<sup>29</sup> By sharing examples of slow infrastructure, we join Eve Tuck in moving away from ‘damage-centered research’ and instead focus on modes of practice that push back against the power structures that so often cause that damage.<sup>30</sup> We do so not in an attempt to suggest a scaling up of activist interventions nor to provide easy solutions to complex issues, but instead to highlight how ethical actions ‘are not necessarily about changing the system, so much as existing in it’.<sup>31</sup> We want to foreground the ways in which slow infrastructures like composting and rainwater harvesting might make more ethical (post)colonial futures possible amongst the decay and maintenance of fast infrastructures. ~~But first, a brief history of the development of fast infrastructures in Kochi for context.~~

### **(Post)colonial infrastructures of Kochi**

Kochi is a city where new and old, slow and fast collide, not only with each other, but with the lush, humid tropics of South India. Known as the ‘Queen of the Arabian Sea’, Kochi is ~~The histories of these collisions are~~ oriented toward the sea/ocean – through the mediation of

~~the~~ a port, in ways that matter to contemporary waste and water infrastructures in the city. Kochi has a long cosmopolitan history of maritime exchange with people from China, Europe and the Arab states going back centuries. The hundreds of Chinese fishing nets scattered around the edges of the backwaters are a lasting testament to this history.

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<Insert figure 1 around here><sup>32</sup>

The colonial, that is *extractive*, history of Kochi (and, in fact, what we now call India) begins with the arrival of Vasco de Gama, a Portuguese explorer, near Calicut just north of Kochi (then Cochin) in 1498. With African slaves aboard the ship, the Portuguese began trading for spices, and eventually made inroads into life throughout the region, primarily through building houses, forts, and churches.<sup>33</sup> A century and a half later, the Dutch wrested control of this increasingly important port town in 1663. They also built many large houses in the distinctively Dutch fashion, including many ‘go-downs’ (warehouses) which stored precious spices and other valuable goods, many of which are still standing today. Both the Dutch and the Portuguese were also ship builders, able to utilise a large workforce of able-bodied Indian men to assist the African slaves they travelled with in expanding their fleet. The influence of this period on Fort Kochi and Mattancherry in particular cannot be overstated. A walk through this historic township is littered with reminders of a past entrenched in colonisation, African slavery, and the spice trade – in many ways the precursors to the fast infrastructures continue to causing havoc in the city today. Even today, popular stops on a tour of Fort Kochi include the St Francis Church (the first European church in India built by the Portuguese in the 16<sup>th</sup> century), the adjacent Dutch cemetery, the Dutch Palace (which was actually built by the Portuguese in 1555), the Santa Cruz Cathedral Basilica originally built in the 1500’s, and the Indo-Portuguese Museum showcasing artefacts from the Portuguese era.

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Bristow, under the guidance of the Governor of Madras Presidency, Lord Willingdon, and was conducted in a three-way collaboration between the two princely states and British controlled Madras. –The seafloor had to be dredged to make way for larger ships, and subsequently Willingdon Island was created with the dredged seafloor in the 1930's. Willingdon Island, named after Lord Willingdon, is the largest artificial island in India and was home to Kochi's first airport. It is now the home of the Cochin Port Trust and the Southern Indian Naval Command. Other parts of the island now lay neglected as the railway that once transported goods across the island has been superseded by road transport. The development of roads during the British era caused a shift from a watery way of life to a terrestrial way of life, at the same time as there was increasing infrastructural development of the Cochin port.

~~There is a museum on Willingdon Island celebrating the mastery and prowess of the infrastructure that built the island and that continues to play a central role in keeping the Cochin port accessible to global shipping infrastructure. The most celebrated feature of the museum is the Lord Willingdon dredger, the vehicle that dredged the seafloor which became Willingdon Island. The aspiration for development in the name of speed and convenience is palpable throughout the museum. The work that the dredger began in the 1930's continues today on a daily basis, creating turbidity and disturbing the ecology of the lake. During one interview with an engineer at the Cochin Port Trust, the first author was told how the lake is at the mercy of international shipping standards. These standards are determined through the expansion of shipping freight capacity and the subsequent altering of crucial chokepoints of shipping infrastructure such as the Suez and Panama canals. By investing in global shipping infrastructure, as the Cochin Port Trust did in 2008 by building an international shipping container terminal on the north side of Lake Vembanad, Kochi continues to prioritise profit~~

~~over environment through large infrastructure projects promised on speed and convenience.~~

Even as ‘exposure to the wider world is an ancient feature of Kerala’s heritage’,<sup>41</sup> the nature of that exposure has changed over time through colonisation, independence, and onset of neoliberal capitalism in the late 20<sup>th</sup> century. These developments have often been infrastructural in nature, as ‘new infrastructures make old ways of life difficult to maintain’.<sup>42</sup> The infrastructural developments by the British transformed the entire ecology of the region in the name of speed and extraction, reshaping social relations along the way. The infrastructural developments above were mirrored by two social movements. The first was a caste based and pro-British movement in the late 19<sup>th</sup> and early 20<sup>th</sup> century. The lower castes were pro-British as they understood them to have ‘a greater sense of justice than the princely states’.<sup>43</sup> The second was a Marxist workers movement that was distinctly anticolonial and raised for the first time ‘connections between colonial capital, British rule, and class-based exploitation’.<sup>44</sup> What was initially recognised as a welcome disruption to the cruel caste system, the extractive and exploitative capacities of the British empire were realised as the speed and scale of the extraction and capital accumulation grew. These examples provide a historical account of the social nature of the infrastructures – an important narrative to consider when we turn to the transformative potential of slow infrastructures below.

~~Today~~ Despite the complex history of these infrastructural developments and the social movements that mirrored them, Kochi continues down a path of speed, convenience, and economic growth, to the detriment of the environment and the health of human and non-human populations. The many canals, once the lifelines of the city, are now odorous drains filled with water hyacinth (an invasive weed from South America), sewage, and industrial

pollution. Drinking water is increasingly scarce despite the abundant rainfall, and many Kochites are now reliant on the distribution of purified water in the form of 20 litre cans.

<Insert figure 4 around here>

The neglected and blocked canals, together with Kerala's notoriously congested road network (which now work in contradiction to their emergence as a vector of speed), also significantly contribute to increasingly violent annual monsoonal floods. In August 2018, during the worst floods Kerala had experienced in a century, ~~the~~ Kochi's international airport built 20km north east of Kochi-the city in the 1990's turned back into the river that used to be in its place. Consequently, ~~t~~he airport was shut for three weeks, causing chaos for ~~tourists~~ the vital tourist economy and Kochi's increasingly mobile middle-class. In other words, ~~t~~he techno-optimism of the 'smart city' could not cope with the increasingly 'demanding environments' in which it was embedded,<sup>45</sup> and which are further threatened by rising temperatures, changing monsoon cycles and sea level rise. But there are two ways, discussed in what follows, that people in Kochi are looking beyond the breakneck speed of development by embracing slow infrastructures. The ethnographic examples below provide insights into how simpler, slower- infrastructures might circumvent the disposition left by the violence of this colonial extractive regime history by reshaping more-than-human social relations in surprising ways.

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### Composting as slow infrastructure

While composting is an age-old practice evident in relationships to the soil going back hundreds of years,<sup>46</sup> it has recently gained traction among urban communities looking for

sustainable solutions to an increasingly prevalent global ‘waste crisis’. As the infrastructures built to eliminate waste quickly and conveniently ~~continue to~~ either breakdown or reach capacity, composting has become a slower, simpler method of waste management that offers an efficacious way of getting ones’ hands dirty. Through an emphasis on maintenance, care, responsibility, and cooperation amongst humans and non-humans alike, composting helps to unwork convenience and speed by connecting people to each other and to the rhythms of the more-than-human world. As a daily practice, it helps with the practicalities of segregating waste at source – highlighting the dangers of non-degradable wastes such as plastics – and promotes a degree of self-reliance in uncertain times. This self-reliant (swaraj) practice takes seriously the call of ‘my waste, my responsibility’ – a motto -which can be seen on roadside signs throughout India since Prime Minister Modi’s Swachh Bharat (clean India) campaign began in 2014.-

~~Historically, the responsibility for the management of waste has almost exclusively fallen onto the modern state. This is the case for bodily excrement in the form of sewage,<sup>47</sup> and municipal solid waste,<sup>48</sup> mostly comprised of discarded plastics and other materials that have emerged since the industrial revolution.~~

In urban (post)colonial India, the responsibility for managing waste often falls to either the urban local bodies (ULB) with the seventy-third and seventy-fourth amendments to the constitution,<sup>49</sup> or to lower caste manual scavengers. ULB’s are often under-funded and under resourced. This means that waste management in urban India is often patchy and unequal, reflecting social and ethnic hierarchies, and reliant on particular groups of peripheral communities who have managed to address the issue at a grassroots level. These local clusters of knowledge and practice create friction with the local government, whose official responsibility it is to handle waste. Unable or unwilling to negotiate this patchwork of national, state and community level policies ~~and uneven relationships and actions~~, the Indian

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waste accumulating roadside, ~~and~~ waterways and canals full of rubbish and industrial pollution — by pursuing a transnational public-private-partnership to replace the landfill with a waste-to-energy (WTE) plant. Pitched as a renewable energy source and a solution to the waste crisis.

~~This is a very common and highly publicised technology adopted as a solution to the waste crisis in northern Europe.~~<sup>54</sup> One of the key arguments against the development of WTE in Kochi is the large

percentage of organic material in the waste profile, ~~w~~ which some waste management experts in Kochi claimed to be as high as sixty percent. Given the high moisture content of the organic waste, the abundance of monsoonal rains, and the tropical humidity of south India, you have

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the conditions that are extremely difficult for generating energy from the incineration of waste. These conditions, however, are perfectly suited to the microbial activity required for composting. In support of composting, ~~o~~ As one research participant poetically emphasised poetically:

~~extending from the land to the sea, the land is a rich and fertile field, which is a gift from the earth. You can do anything from the land to the sea, the land is a rich and fertile field, which is a gift from the earth.~~

Despite the ripe environmental conditions for composting in Kochi, the practice is difficult to implement at the household level, and difficult to scale up to the city level. The problems lie in the ‘requirements of space, cooperation, relentless application, and systematic maintenance’ needed to make composting viable.<sup>55</sup> These problems are particularly problematic in India where household labour is often gendered, and association with waste is intimately tied to the inequities of the caste system.<sup>56</sup> Furthermore, they are also particularly

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difficult to implement due to Kochi’s deeply colonial and extractive infrastructural history. Furthermore, space in Kochi is in increasingly short supply due to rapid urbanisation. Despite these constraints, ~~many environmental activists are~~ there is a growing movement of activists helping environmentally conscious institutions in Kochi turn to decentralised composting as a way to gain traction in the fight against waste, ~~to generate fertilizer for their gardens, and to~~



the island. According to the composting manager, the island used to be ‘a waste dump filled with syringes, snakes and wild plants,’ until a visitor from the United States helped turn the island into a composting facility. He went on to explain that before they built the composting facility together ‘no one knew anything about waste segregation or composting.’ They subsequently spent months clearing the land and building the facility after gaining permission from Amma. Now as he told us, ‘the environment is very pleasant’, ‘there is no smell’, and it is a ‘good climate’.

The composting facility processes all of the hospital’s organic wastes each day. Large tubs of food waste are mixed with piles of ~~other~~ organic matter from around the facility, mostly leaves and other garden debris. After a few days, once the pile begins generating heat, it is moved to the adjacent composting area that relies upon multispecies relationships. Here, rows of compost bays line the cement floor under a large corrugated iron ceiling with open sides. The process is sped up by the introduction of worms ~~— this process is, known as turning this in a~~ vermi-composting facility —, and ~~and~~ within 20 days the final product is ready to be used in garden maintenance and other environmental aesthetics projects around the property. The work is time intensive and constant, yet ~~but~~ fulfilling, as the manager explains:

When I do this work, no other thoughts come to my mind. Once upon a time I wanted to be a well-connected man in the hospital. Now I am so focused on this work that I feel no interest to come to the main hospital site.

If ~~waste modern~~ infrastructures like landfills and WTE tend to speed things up, accelerating the crises through their promise of convenience and technological advancement, composting holds the promise of earthly flourishing through an unworking of speed and convenience. As

an elemental and multi-species practice that requires close attention to moisture, heat, and time, it extends care and attention beyond the human. It does so by being a particularly affective practice, which often challenges and expands the olfactory and haptic senses through an intimacy with more than human relations to plants, soils, worms and other vermin. These kinds of multispecies and sensorial relations that composting entails 'facilitates a reconsideration of infrastructure's relationship with nature'.<sup>57</sup> This kind of reconfiguration of attention and attunement beyond the human requires patience and a willingness to get dirty, as it challenges the implicit human exceptionalism and entitlement tied up in many fast infrastructures. In this way, composting acts as a bridge between death and life, helping recognise that life feeds on life. Through turning disposed or left-over biological matter with soil and other critters to make fertile ground, composting aids in food production, soil health, and helps to create 'relations of care' that push back against the convenience and speed of fast infrastructures.<sup>58</sup>

~~These~~ The relations of care that emerge amongst slower infrastructures – —the unworking of speed and convenience – — extend to the fellow humans with which compost is made. A number of composting staff interviewed readily expressed satisfaction and even 'happiness' in doing their work. Supporting their statements, the chief operator boasted that the facility had a higher retention rate of employment than other similar jobs in the city due to the atmosphere that this kind of work built. In other circumstances, manual labour employment would be inconsistent and seasonal. Furthermore, by taking the time to visit the composting facility, composting also challenged implicit social hierarchies amongst other staff in the hospital.

The hospital staff member who joined the tour, for example, found the experience to be quite transformative in ways that she did not anticipate. A woman of advancing age and many years of service in management at the hospital, she who would normally be stationed in the house keeping department where she orchestrated staff ~~assignments~~ administration while also joining in on the cleaning duties that arose. She joined the tour of the composting facility out of a curiosity after the first author expressed interest in the facility ~~when they first~~ during an earlier ~~meeting~~ to discuss waste management practices at the hospital. Despite her long tenure at the hospital, she had never ventured to the composting area or visited the other waste management facilities on site (outside the hospital wards). After arriving on the fresh aired island and learning from the operator of the compost facility's hygienic practices, she later reflected on ~~the preconceived bias against the people working with bodily and food wastes that had partially delayed her decision to~~ how moving it was for her to see the composting work firsthand. ~~But rather than having her biases confirmed, the excursion filled her with pride and shame.~~ As she described:

I must say that having been here (at the hospital) for so many years, that's the first time I've really got to know what's happening here... I just realised that even I don't know the big picture... (but after seeing this) I feel very proud... When I say I face this bias in my work, I must also accept that even I had a bias towards the (compost facility and its staff).

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Commented [A22]: A2 to A1: For Maya's sake, I think we should cut this. Jay is going to read this. Probably Sunanda, as well. Maybe even Maya. I think she might lose face with this comment. And she will look better if we leave the comment at ... (but after seeing this) I feel very proud.'

Building relations of care that extend to fellow humans as well as plants, soils, and other critters, composting 'puts practitioners not so much "in charge" of ecological management and food production, but sees them as attentive members of a specific ecological, soil foodweb community'.<sup>59</sup> The vermi-composting that the ~~composting~~ staff described, for

instance, has the potential to enact a world premised on kind-of multi-species flourishing through ‘solidarities among diverse communities, human and otherwise’.<sup>60</sup><sup>61</sup> In other words, the daily practice of composting helps to reshape our relations among humans through ‘possibilities of solidarity with nonhumans’, turning previous biases into composting yards into places that inspire moments of pride and acknowledgement wonder.<sup>62</sup> In this way, through its unworking of speed and convenience and it’s disposition toward smaller medium scale initiatives, composting holds the potential to rupture and reconfigure existing fast infrastructures as well as political and social categorisations built on inherited and culturally re-enforced hierarchies – such as colonial rule, caste and gender norms. It also has the potential to build more responsible and ecological futures. -Another earthly practices slow infrastructure that holds the particular promise in this tropical south Indian city is the simple yet effective practice of capturing rain where it falls.

### **Rainwater harvesting as slow infrastructure**

The fortunate among us experience split-second infrastructural speed every time we turn on the tap. The expectation that water should flow forth, backed by hydraulic pressure and an underground grid of municipal pipes,<sup>63</sup> is itself an anticipation and a demand for hydrological speed and convenience. The ‘modern’ convenience of indoor plumbing, in fact, is intended to save ‘time as well as reducing toil and trouble’.<sup>64</sup>

In most urban zones, tap water is transmitted from faraway locations where it can be processed and transferred in bulk.<sup>65</sup> Most often, this water comes from rural watersheds where the water has competing demands for ecosystem services and agriculture.<sup>66</sup> In the parts of the world where these rural watersheds are heavily inhabited by human and non-human populations, urban water demands can be complicit in removing vital resources needed to

support livelihoods. And, despite the daily crises of water access that such rural areas can experience, news articles predominantly focus upon water stress when piped flow to urban settlements becomes jeopardised. The media attention to recent ‘water crises’ in Cape Town, South Africa and Chennai, South India are a case in point.

There is an alternative, but it requires frequent care, upkeep, and a sense of responsibility for managing one’s own water resources. This alternative is urban rainwater harvesting. It involves catching water where it falls on rooftops, roads, parks, and playgrounds. This water is then transferred into underground storage tanks (which are paved) or recharge wells and recharge pits (which are unpaved). The former captures and contains the water for immediate use whereas the latter allows for the percolation of rainwater into the subsoil where it recharges the groundwater.

Based on the specific subset of fieldwork that focused on rainwater harvesting in Kochi, the technology appears to offer a viable and effective practice for urban infrastructural overhaul. That said, its widespread implementation is proving to be a challenge given the acceleration of time-restricted tasks and demands in everyday life.<sup>67</sup> For while it is straightforward to implement at a relatively low cost,<sup>68</sup> it is a practice that requires regular maintenance – and attention to acts of maintenance is ‘not so much about defective infrastructural objects’ as it is about understanding the social and political relationships in which they are embedded.<sup>69</sup>

In the case of rainwater harvesting, the amount of care and labour required to maintain systems in working order can be extensive. Before the rains arrive, rooftops, roads, and courtyards need to be cleared of debris. When the rains arrive, a ‘first flush’ must let this first dose of (often acid) rain slip away, clearing and cleaning the grounds upon which it falls in

the process. Then comes the period of capture and storage while the rains are falling. Once they stop, drains, pipes, filters, and storage containers must be repaired for the inevitable damage caused by the deluge. And before too long, the cycle must be repeated.

These are all time intensive practices. And this time intensivity is processual and cyclical. It requires values of care for equitably sourced and managed water as well an ethical commitment to the slow infrastructures that help to harvest and store these rains directly. So why bother? For one, harvested rainwater has an immense potential to meet the current and rising water demands of many South Asian cities. In Kochi, a total water wealth of 3000 millimetres falls annually and is spread over the course of not one but two seasonal monsoons. Another reason is that rainwater harvesting is a long-standing practice for inhabitants of the region as it was formerly part of the common-sense tactics of survival in everyday life, as Michel de Certeau might argue,<sup>70</sup> prior to the installation of piped water infrastructures. Typical acts of water harvesting included the use of artificial lakes created from rain (*madaka*)<sup>71</sup> along with well recharge practices and the filling of pots and barrels to meet household water needs. As older generation residents explained to us in interviews, knowledge of how to harness the rain for water security used to be passed down through generations. This knowledge is being lost as people become increasingly reliant upon piped water supplies, and as the elderly pass on without the transmission of their expertise.

One group, however, is working concertedly to revive knowledge of rainwater harvesting practices and to expand its installation and use across a range of topographies within Kochi, and Kerala more broadly. Known as Inspire India, this group is composed of architects, project managers, infrastructure engineers, structural engineers, and landscape designers. Their work is guided by core principles for all of their project designs. These include: the



concept of ‘environmentally sustainable development’, the need for conserving energy and switching to renewable sources when possible, and the ‘need to be socially responsible amidst often over built and obsolete governmental and societal systems and norms’.<sup>72</sup> To achieve this, they offer a set of key services featuring ‘home grown progressive sustainable concepts’ that target ‘total water management’ via the installation of rainwater harvesting lakes combined with anaerobic waste water treatment and recycling systems.<sup>73</sup> These technologies offer what one member of Inspire India – an architect and hotelier who we will call Govinda – called an ‘integral approach’ to infrastructural design that ‘appeals to your conscience straightaway.’

For people like Govinda, an ‘integral’ approach to architecture involves thinking of more than the initial structure to be built. It also entails thinking of how and where the water comes from, how to take care of the waste that the users inside a building generate, and how to landscape a property with the regionally appropriate plants and species that will help to encourage water retention and flourishing green spaces. Given the overall challenges of water access and management in a place like Kochi, rainwater harvesting has taken pride of place in many of Govinda’s buildings. Yet, as he explained in our first of two interviews in February of 2018, not everyone in his profession is as enthusiastic about the promise of such environmentally-minded technologies. At first, he confessed, ‘we were considered odd people’ because very few in his professional networks saw value in using ‘local materials and eco-friendly architecture’. As a result, they faced ‘lots of difficulties’ as well as ‘unnecessary accusations’ that he portrayed with a wave of a hand saying – in the role of a fictional third person – ‘all these things don’t work’ and ‘it doesn’t make any sense’. But, he continued, ‘we somehow managed to survive’ after a rocky start in the late 1980’s and early 1990’s. Given the scope of impressive ‘eco-friendly’ projects that he has built, people like Govinda appear

to have thrived rather than just survived. And the use of rainwater harvesting is a cornerstone technology for many of their projects.

The trick to successful rainwater harvesting, as Govinda explained, is that you have to capture and 'hold' the water in order to make use of it. This imperative for water retention is easier said than done, and there are various strategies and technologies that can be applied depending on the geomorphology and topography of a given location. One earlier mentioned option is to direct harvested rainwater into recharge wells and natural ponds that percolate it back into the groundwater over time. 'But,' he cautioned, 'in some places these ponds and wells have already become contaminated – (they are) all saline'. To work around this problem, Govinda and his colleagues have created cement-lined artificial lakes in a number of their projects. The size of these lakes depends on a calculation that they call the 'consumption recharge profile', which is the estimated amount of water use at a given location along with the amount of water that can be harvested over the two regional monsoons, minus estimates for evaporation. To keep the water free of mosquitoes, fish are also required to keep the artificial lakes healthy – and they too need a minimum amount of water after both consumption and evaporation. The end result of a successful project, he stressed with drawn out pronunciation, is the creation of a '*totally new ecosystem*'.

To see firsthand what such efforts can achieve, we toured on three separate occasions a flagship hotel, and self-acclaimed 'eco-resort', designed and run by Govinda and his colleagues. Built in the early 1990's and situated just off a main highway in the heart of ~~mainland Kochi~~Ernakulam, the establishment features a network of two to three story buildings finished with red brick exteriors. Driving or walking into the complex after

following a ~~mild~~ slope down from the adjacent highway, one quickly gets the impression of entering into quieter and calmer environs.

To a visitor, the eco-resort feel of the hotel is heightened by an abundance of trees and gardens, a green playground, a spacious pool and, of course, the serene presence of an artificial lake that sources 20,000 litres per day of the hotel's water requirements. Since the lake semi-circles the exterior of the property, its presence is subtle and it feels more like a landscape accent than a high functioning and self-sufficient water management system. One might imagine, in fact, that most guests have no idea of its purpose or the fact that the water running through their taps and showers is caught, filtered, and circulated on site. Such obliviousness is part and parcel of the design and functioning of infrastructure. After all, 'The normally invisible quality of working infrastructures only becomes visible when it breaks: the server is down, the bridge washes out, there is a power blackout'.<sup>74</sup>

<Insert figure 5 around here>

Given the success of the property, even from a budget savings perspective alone, it is striking that more hoteliers and businesses have not taken on a similar model. According to Govinda, the lack of similar buildings is no longer due to a dearth of interest but, poignantly, due to time management constraints that further underscore the importance of speed and convenience. During the driest season from February to March, claims Govinda, the offices of Inspire India now get overwhelmed with requests for their expertise to overhaul buildings and to install rainwater harvesting units. Parroting the typical inquiry, he explained that the request was often along the lines of 'Why don't you come and install it tomorrow?' As that is usually impossible, especially since it can take 'at least' one to two months for such projects

to be completed, the initial interest often dissipates. For the projects that do get completed, there are also disappointments because by the time a rainwater harvesting unit is installed, the dry season might have ended, and the taps might be flowing freely again. ‘And then the crisis goes away – and then they forget it, they won’t maintain it,’ he quipped. Reflecting on this cyclical process, he made a disclaimer that he knows ‘a few people who are sincere’ and who do understand the importance of taking the time to both install and care for rainwater harvesting infrastructures. ‘But it has not come to the stage where there is a mass awareness – enough for people to make a collective action. That has not yet come to (fruiting).’

While lack of uptake for rainwater harvesting is undoubtedly a source of consternation for the environmentally minded, as well as for the municipality (which has tried to raise public awareness of the need for decentralised acts of rain capture)<sup>75</sup>; there are indications that the growing resource constraints in cities like Kochi might force change in the coming years. And as it becomes increasingly inconvenient to source water from stressed river basins, there emerge opportunities to reorient ourselves to the value of slowing down, and to embracing slow(er) infrastructures such as the technologies associated with urban rainwater harvesting. The added bonus that such technology presents is that, once installed, it sits at the ready to receive the cyclical bounty of the rains, even in times of municipal breakdown and urban turmoil. So, while it might appear to be another ‘boring’ and ‘singularly unexciting’ infrastructural technology,<sup>76</sup> rainwater harvesting offers the thrilling potential for water self-sufficiency – enhancing our ability to manage present and pending resource crises.

Finally, and as other ethnographers of this practice point out, these everyday acts of ‘mutual constitution’ with rainwater can have significant subjective implications as people learn to become better, and more ethical, resource stewards and urban citizens.<sup>77</sup> Once people reframe

their relationships to water as one of ‘commensalism rather than parasitism’,<sup>78</sup> they also reshape their relationships with other water users since all technologies of water management are embedded in social and political systems.<sup>79</sup> They do this by diminishing their role in the perpetuation of unequal water access – which as earlier noted marks the rural-urban resource divide as well as the economically-driven resource disparities within South Asian cities – and by showing others how they, too, can be better care for water stewards in better ways. So, while rainwater harvesting is distinct from composting as a technology and a set of practices, it has similar potential to transform how people see themselves and how they connect with, and to, others.

**Commented [A24]:** This paragraph adds to the conceptual insights while also building more of the bridging work between the two cases that a reviewer encouraged in the revisions.

### **Unworking fast infrastructures**

As Cymene Howe and her colleagues write, ‘the infrastructures of modernity are killing us’.<sup>80</sup> In the pursuit of convenience and speed, the contemporary surfeit of ‘modern’ infrastructures continue to introduce new hazards.<sup>81</sup> And yet, the more these infrastructures are taken for granted – and assumed as superior – the more difficult it is to prepare for, and to anticipate, their failure. The risk of infrastructural ‘urban failure’ is all too possible, of course, because cities are ‘imperfect machines of coordination’ poised on the edge of collapse.<sup>82</sup> When they are able to stave off this looming decline, it is because of the distributed intelligence of ‘diverse kinds of knowledge, lay and expert’.<sup>83</sup> Said differently, the ability of (post)colonial cities to remain nimble in the face of failure requires infrastructural adaptability along with an embrace of technologies that have weathered the test of time.

To do infrastructure differently, in a way that responds to contemporary risks and anticipates future crises, we have argued for a re-embrace of slower moving infrastructures. We also

acknowledged that it takes *time* to care and to maintain slow infrastructures in ways that do not involve exploitation. Furthermore, these acts of care and maintenance require an embrace of the kinds of infrastructures that can thrive and flourish over circular time since these slower infrastructures are often designed to weather natural and human-made seasons of expansion and contraction. Such infrastructures can help to reconfigure our relationships with time and temporalities in other words,<sup>84</sup> even as they create material forms that allow for new/old possibilities of movement and exchange over space.<sup>85</sup>

The challenge of upscaling alternative infrastructures, however, remains the need for perceptual and ideological change. After all, what we value in everyday life is reflected in our built environments because ‘infrastructure decisions are a commitment’.<sup>86</sup> A key to the required shift in values is a reorientation to predominant attitudes that elevate speed and convenience as social goods. To date, the reliance on convenient solutions has had the cumulative effect of defining what people value, and what they take for granted.<sup>87</sup> What is needed, then, are efforts to illuminate the externalities of socio-temporally accelerated convenience *alongside* examples of how slowing down can create the nimbleness required to reduce these externalities. And while some of the solutions on offer do require more time and more labour-intensive maintenance at the cost of the speed to which many have become accustomed, they also offer a possible reordering and re-specification of what we might consider to be ‘normal and necessary ways of life’.<sup>88</sup>

It is here that we get to the issue of, and the need for, unworking. The move from fast to slow infrastructures will unlikely be seamless or absolute because it requires an unworking of entrenched values alongside the embrace of new-simple desires. This unworking, then, is also a ‘pedagogy of unlearning’ that will continue to run into our own ‘aspirational

ambivalence'.<sup>89</sup> According to Lauren Berlant, this aspirational ambivalence exists and persists due to our 'aggressive need' for the world to accommodate us *and* (original emphasis) due to our own resistance to adaptation.<sup>90</sup> Even at a time of intense global turmoil – such as the forced slowing down we have collectively experienced in response to the crises caused by the Covid-19 pandemic – we see vocalised in the public and political discourse twin desires to work with our 'new normal' as well as a hope for a swift return to the fast-paced lives that several of us so desperately railed against. When the world spins too fast, it seems, we seek to slow down; and when it slows, we aspire to speed up.

The point of underscoring the effort to work with, and to unwork, our aspirational ambivalence to acknowledge that, like infrastructures themselves, the effort to move towards slow(er) ways of doing and being in the world will be a process that ebbs and flows. Slow infrastructures are, nonetheless, a meaningful pursuit because they serve as a potential antidote to the many perils we face. Due to the significant human and non-human connections that they enable, and the ethics of care and the maintenance that they require, they come with the important promise of a-livese more connected to others, and to the cycles of life itself. If sealed up to a significant degree adopted and adapted in similar settings, these slow infrastructures might even yield accelerated action for addressing the multitude of environmental challenges we presently face.

**Word Count:** 98117475690879

### **Acknowledgements**

We would like to thank our host institution in Kochi, the School of Business at Amrita Vishwa Vidyapeetham, and -particularly Jay Misra and Professor Sunanda Muralieedharan.

We also thank the hosts and fellow panelists at the ‘What We Talk About When We Talk About Crisis: Social, Environmental, Institutional’ conference – hosted by the Humanities Research Centre at the Australian National University in December 2019 – where the first draft of this paper was presented. ~~and~~ We we also acknowledge the generous funding of the Australian Research Council (DE160101178) and the generative comments of ~~two~~he anonymous reviewers. ~~;~~

#### **Declaration of interest**

Blinded for review. -N/A

#### **Author Bio**

Blinded for review

#### **Notes**

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<sup>2</sup> Here, we draw inspiration from scholarship that critiques the term *Anthropocene*. We avoid using the term because of its unwillingness to ‘stay with the trouble’. See Donna Haraway, *Staying With the Trouble: Making Kin in the Chthulucene* (Durham & London: Duke University Press, 2016); Kathryn Yusoff, “Anthropogenesis: Origins and Endings in the Anthropocene,” *Theory, Culture, & Society* 33 (2016): 3-28; Heather Davis and Zoe Todd, “On the Importance of a Date; Or Decolonizing the Anthropocene,” *ACME: An International Journal for Critical Geographies* 16, no.4 (2017): 761-780.

<sup>3</sup> Cymene Howe, *Ecologies: Wind and Power in the Anthropocene* (Durham & London: Duke University Press, 2019): 2.

<sup>4</sup> For more on cheap labour and cheap energy see: Raj Patel and Jason Moore, *A History of the World in Seven Cheap Things: A Guide to Capitalism, Nature, and the Future of the Planet* (London: Verso Books, 2018).

<sup>5</sup> Ash Asmin, “On Urban Failure,” *Social Research: An International Quarterly* 83, no. 3 (2016): 779.

<sup>6</sup> Max Liboiron, Manuel Tironi, Nerea Calvillo, “Toxic Politics: Acting in a permanently polluted world,” *Social Studies of Science* 48, no. 3 (2018): 341.

<sup>7</sup> Throughout this article we employ the parenthesized “post” in (post)colonial to emphasize the enduring affects and materiality’s of the colonization process that continue today despite the fact that India gained independence in 1947.

<sup>8</sup> It is important to recognize the often slow and invisible violence associated with fast infrastructures. See Rob Nixon *Slow Violence and the Environmentalism of the Poor* (Cambridge: Harvard University Press, 2011); and Thom Davies, “Toxic Space and Time: Slow Violence, Necropolitics, and Petrochemical Pollution,” *Annals of the American Association of Geographers* 108, no. 6 (2018): 1537-1553.

<sup>9</sup> Brian Larkin, “The Politics and Poetics of Infrastructure,” *Annual Review of Anthropology* 42 (2013): 328.

<sup>10</sup> ~~See Laura Bear. In Laura Bear *Lines of a Nation: Indian Railway Workers, Bureaucracy, and the Intimate Historical Self* (New York: Columbia University Press, 2007) ~~;~~ Laura Bear has argued that developments such as the Indian railways were not infrastructures but rather ‘public works for the material and moral progress of the subject nation’. We As we later arguesuggest in this discussion, these projectsat they live on as infrastructure~~



through the ways they (dis)connect human and more-than-human life in (post)colonial India. For more on the Paris sewers see Matthew Gandy, "The Paris sewers and the rationalization of urban space," *Transactions of the Institute of British Geographers* 24, no. 1 (1999): 23-44; for more on the Panama Canal see Ashley Carse, *Beyond the Big Ditch: Politics, Ecology, and Infrastructure at the Panama Canal* (Cambridge: MIT Press, 2014).

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<sup>11</sup> Ashley Carse and David Kneas, "Unbuilt and Unfinished: The Temporalities of Infrastructure," *Environmental and Society: Advances in Research* 10 (2019): 12.

<sup>12</sup> Larkin, "Politics and Poetics of Infrastructure," 337.

<sup>13</sup> Robin Jeffrey, *Politics, women, and well-being: how Kerala became a "model"* (Basingstoke, Palgrave Macmillan, 1992). Kerala dev model citation

<sup>14</sup> Elizabeth Shove, *Comfort, Cleanliness and Convenience: The Social Organisation of Normality* (Oxford: Berg, 2003).

<sup>15</sup> Ibid.

<sup>16</sup> Megan Warin, Bridget Jay, and Tanjya Zivokovic, "'Ready-made' Assumptions: Situating Convenience as Care in the Australian Obesity Debate," *Food and Foodways* 27, no. 4 (2019): 1-2.

<sup>17</sup> Ibid.

<sup>18</sup> Soumya Venkatesan, Laura Bear, Penny Harvey, Sian Lazar, Laura Rival, and AbdouMaliq Simone, "Attention to infrastructure offers a welcome reconfiguration of anthropological approaches to the political," *Critique of Anthropology* 38, no. 1 (2018): 3-52.

<sup>19</sup> Ashley Carse, *Beyond the Big Ditch: Politics, Ecology, and Infrastructure at the Panama Canal* (Cambridge: MIT Press, 2014): 204.

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<sup>20</sup> Akhil Gupta, "The Future in Ruins: Thoughts on the Temporality of Infrastructure," in *The Promise of Infrastructure* (Durham & London: Duke University Press, 2018): 62.

<sup>21</sup> Ara Wilson, "The Infrastructure of Intimacy," *Signs: Journal of Women in Culture and Society* 41, no. 2 (2016): 247-280.

<sup>22</sup> Ibid, p 272.

<sup>23</sup> Laura Bear, *Lines of a Nation, 1*.

<sup>24</sup> Laura Bear, *Lines of a Nation: Indian Railway Workers, Bureaucracy, and the Intimate Historical Self* (New York: Columbia University Press, 2007): 1-

<sup>25</sup> Howe, *Ecologies*, 6.

<sup>26</sup> Jamie Cross, "The Economy of Anticipation: Hope, Infrastructure, and Economic Zones in South India," *Contemporary Studies of South Asia, Africa, and the Middle East* 35, no. 3 (2015): 424-437.

<sup>27</sup> See also Achille Mbembe, *On the Postcolony* (Berkeley: University of California Press, 2001).

<sup>28</sup> Hannah Appel, "Infrastructural Time," in *The Promise of Infrastructure* (Durham & London: Duke University Press, 2018): 59.

<sup>29</sup> Shannon Mattern, "Maintenance and Care," *Places Journal*, November 2018, accessed 08 March 2020, <https://doi.org/10.22269/181120>

<sup>30</sup> Eve Tuck, "Suspending Damage: A letter to Communities," *Harvard Educational Review* 79, no. 3 (2019): 409-427.

<sup>31</sup> Liboiron, Tironi and Calvillo, "Toxic Politics," 42.

<sup>32</sup> Kochi Map. 2010. Wikimedia Commons:

[https://upload.wikimedia.org/wikipedia/commons/thumb/4/4b/Kochi\\_map.png/435px-Kochi\\_map.png](https://upload.wikimedia.org/wikipedia/commons/thumb/4/4b/Kochi_map.png/435px-Kochi_map.png)

<sup>33</sup> Ashish Nandy, "Time Travel to a Possible Self: Searching for the Alternative Cosmopolitanism of Cochin," *Japanese Journal of Political Science* 1, no. 2 (2000): 299.

<sup>34</sup> Manili Desai, "Indirect British Rule, State Formation, and Welfarism in Kerala, India, 1860-1957", *Social Science History* 29, no. 3 (2005): 457-488.

<sup>35</sup> Laura Bear has argued that these developments such as these were not infrastructures but rather "public works for the material and moral progress of the subject nation". We argue that they the extractive development in Kochi under the direction of the Governor of Madras and orchestrated by the princely states of Cochin and Travancore can retroactively be termed infrastructures as they significantly altered the more than human relations of the city in ways that persist today. I live on as infrastructure through the ways they (dis)connect human and more than human life in India.

<sup>36</sup> Manu Pillai, *The Ivory Throne: Chronicles in the House of Travancore* (Noida: Harper Collins, 2015): 227-228.

<sup>37</sup> Ibid., 228.

<sup>38</sup> Penny Harvey and Hannah Knox, "The Enchantments of Infrastructure", *Mobilities* 7, no. 4 (2012): 512-536.

<sup>39</sup> To be clear, these developments were largely orchestrated to fulfil the growing desire for tea back in Britain, but they also provided opportunities for the Indian elite to begin redistributing wealth into education and welfare programs.

<sup>40</sup> Ashley-Carse and Joshua A. Lewis, "Toward a Political Ecology of Infrastructure Standards: Or, How to Think about Ships, Waterways, Sediment, and Communities Together," *Environment and Planning A: Economy and Space* 49, no. 1 (2017): 10.

<sup>41</sup> Pillai, *The Ivory Throne*, Manu Pillai, *The Ivory Throne: Chronicles in the House of Travancore* (Noida: Harper Collins, 2015): 8.

<sup>42</sup> Carse, *Beyond the Big Ditch*, 52.

<sup>43</sup> Desai, *Indirect British Rule*, 480.

<sup>44</sup> *Ibid.*

<sup>45</sup> Carse, *Beyond the Big Ditch*, 220.

<sup>46</sup> Nicholas Kawa, *Amazonia in the Anthropocene: People, Soils, Plants, Forests* (Austin: University of Texas Press, 2016).

<sup>47</sup> Dominique Laporte, *History of Shit*, trans. Nadia Benabid and Rudolph el-Khoury (Cambridge: MIT Press, 2002).

<sup>48</sup> Assa Doron and Robin Jeffrey, *Waste of a Nation: Garbage and Growth in India* (Cambridge and London: Harvard University Press, 2018).

<sup>49</sup> Assa Doron and Robin Jeffrey, *Waste of a Nation: Garbage and Growth in India* (Cambridge and London: Harvard University Press, 2018). *Ibid.*

<sup>50</sup> One of the key lessons from the concept of the Anthropocene is that there is no such thing as *away*: the landfill on the outskirts of town continues to alter life on Earth in small yet significant ways. See Timothy Morton, *Dark Ecology: For a Logic of Future Coexistence* (New York: Columbia University Press, 2016): 46, 125.

<sup>51</sup> This is at least true of municipal solid waste, including plastics and other hard wastes, as well as organics such as food and paper. There are overlapping and divergent tactics for other wastes such as sewage.

<sup>52</sup> Doron & Jeffrey, *Waste of a Nation*, 43.

<sup>53</sup> Ganesan citation on decentralised WM in Kerala Prathiba Ganesan, "Landfill sites, solid waste management and people's resistance: a study of two municipal corporations in Kerala," *International Journal of Environmental Studies* 74, no. 6 (2017): 958-978. a

<sup>54</sup> For more on the transition to waste-to-energy infrastructure in India and beyond see Chloe Ahmann, "Waste-to-Energy: Garbage Prospects and Subjunctive Politics in Late Industrial Baltimore," *American Ethnologist* 46, no.3 (2019): 328-342; Ingrid Behrsin, "Rendering Renewable: Technoscience and the Political Economy of Waste-to-Energy Regulation in the European Union," *Annals of the American Association of Geographers* 109, no. 5 (2019): 1-17; Federico Demaria and Seth Schindler, "Contesting Urban Metabolism: Struggles Over Waste-to-Energy in Delhi, India," *Antipode* 4, no. 2 (2016):293-313; and Aman Luthra, "Waste-to-Energy and Recycling: Competing Systems of Waste Management in Urban India," *Economic & Political Weekly* 52, no. 13 (2017): 51-58.

<sup>55</sup> Doron and Jeffrey, *Waste of a Nation*, 144.

<sup>56</sup> Assa Doron and Raja, "The Cultural Politics of Shit: Class, Gender and Public Space in India," *Postcolonial Studies* 18, no. 2 (2015): 189-207.

<sup>57</sup> Atsuro Morita, "Multispecies Infrastructure: Infrastructural Inversion and Involuntary Entanglements in the Chao Phraya Delta, Thailand," *Ethnos* 82, no. 4 (2017): 739.

<sup>58</sup> *Ibid.*, 747.

<sup>59</sup> Maria Puig De la Bellacasa, "Making time for soil: Technoscientific futurity and the pace of care," *Social Studies of Science*, 45, no. 5, (2015), 691-716.

<sup>60</sup> Frederique Apffel-Marglin, *Subversive Spiritualities: How Rituals Enact the World* (London: Oxford University Press, 2012).

<sup>61</sup> Liboiron, Tironi and Calvillo, "Toxic Politics," 341.

<sup>62</sup> Timothy Morton, *Humankind: Solidarity with Nonhuman People* (London: Verso, 2019): 25.

<sup>63</sup> Nikhil Anand, "Pressure: The PoliTechnics of Water Supply in Mumbai," *Cultural Anthropology* 26, no. 4 (2011): 542-564.

<sup>64</sup> Shove, *Comfort, Cleanliness and Convenience*, 171.

<sup>65</sup> Nikhil Anand, *Hydraulic Citizenship: Water and the Infrastructures of Citizenship in Mumbai* (Durham & London: Duke University Press, 2017): 47; Georgina Drew, *River Dialogues: Hindu Faith and the Political Ecology of Dams on the Sacred Ganga* (Tucson: University of Arizona Press).

<sup>66</sup> Matthew Gandy, "Landscapes of Disaster: Water, Modernity, and Urban Fragmentation in Mumbai," *Environment and Planning A* 40, no. 1 (2008): 118.

<sup>67</sup> Georgina Drew, "Political Ecologies of Water Capture in an Indian "Smart City"," *Ethnos* (2019), <https://doi.org/10.1080/00141844.2018.1541918>.

<sup>68</sup> Saif Said, "Assessment of Roof-top Water Harvesting Potential in South Delhi, India: A Case Study," *International Journal of Environmental Research and Development* 4, no. 2 (2014): 141-146; Georgina Drew, "Centralised Efforts Needed for Rainwater Harvesting: Pushing Back Delhi's "Day Zero"," *Economic and*

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