

# Stench and sensibilities: On living with waste, animals and microbes in India

Assa Doron 

Australian National University, Canberra,  
ACT, Australia

## Correspondence

Assa Doron, 9 Fellows Rd, H.C Coombs  
Bldg, Australian National University,  
Canberra 2601, ACT, Australia.  
Email: [assa.doron@anu.edu.au](mailto:assa.doron@anu.edu.au)

## Funding information

Australian Research Council, Grant/Award  
Number: DP 190100823

## Abstract

Stench is often the most immediate mark of something dirty, decaying and diseased. In India, stench and the smell of acrid smoke commonly indicate the proximity of an open dump or landfill. Frequently a slum is located in the vicinity too, housing waste-pickers who forage in these sprawling dumps for salvageable waste. These spaces are also host to vermin, birds, stray dogs, pigs, cows and, more recently, dangerous bacteria resistant to even top-end antibiotics, popularly known as ‘superbugs’. In this paper I examine the socio-ecological context of neighbourhood, community open garbage dumps and larger landfills in an effort to understand these as part of a dynamic ecosystem of ‘more-than-human’ relations. Perceptual variations of smell as experienced in and around waste (in its solid, liquid and gas states) are intrinsically linked to symbolic and material practices across species. Additionally, I suggest that one productive way to think about the emergence of disease and pathogenicity is by considering the information stimulated by smell, which is mediated by cultural interpretations, biological capacities and wider political economies.

## KEYWORDS

India, multispecies, olfaction, superbugs, Waste, zoonoses

## 1 | INTRODUCTION

The outbreak of the Coronavirus originally in China and its subsequent spread across the globe has highlighted the vulnerability of our societies and bodies to novel forms of infectious disease. The pandemic has also revealed how microbes and the emergence of infectious disease are intrinsically tied to our way of life: from individual consumer habits and environmental degradation, to the precarity of a global supply chain and the pathogens prevalent in the animal trade sector. Microbes, it is evident, do not work alone; they rely on multiple others in a vast network of human and nonhuman actants.<sup>1</sup>

In this paper, I examine our relationship with more-than-human, including pigs, dogs and cows, as well as microbes, by looking at waste practices and garbage dumps in India. The dump, I argue, is a particularly instructive site in which to examine these relations and the way they inform pathogenicity and infectious diseases. I take pathogenicity to be more than its narrow epidemiological definition, to encompass social, cultural and economic relations (Hinchliffe et al., 2017). To this end, I adopt an ethnographic approach which is particularly attentive to the olfactory experiences and capacities of humans and nonhumans living in and around garbage.

The first part of this paper looks at the emergence of infectious diseases and the human–animal interface, arguing that such dichotomies fall flat in the face of historical and socio-economic aspects of multispecies entanglements. In the second part of the paper, I probe India's garbage dumps and waste relations to examine the human–animal ecologies that surround them. Whereas stench is often the most immediate mark of these 'unruly' spaces, in considering smellscape (see Cohen, 1988; Flikke, 2018), I aim to foreground more-than-human relations in India's waste economies: a subject that has received little attention in the literature so far. These smellscape also serve to highlight how the enduring cultural sensibilities, pathogenicity and exclusion are reproduced in relation to wider processes of urbanisation, changes in animal husbandry and state-driven projects of public sanitation. I argue that when considering emergence of disease and pathogenicity in India, we need to understand waste and the symbolic and material relations and practices that frame more-than-human relations. One productive way to think about these concerns is by analysing cultural perceptions and experiences of odour.

The paper utilises long-term ethnographic fieldwork in the city of Varanasi (Banaras) carried out over several periods from the early 2000s to 2016. In addition, I draw on multiple shorter trips to various Indian cities, towns and villages over the past five years, as part of a collaborative project that examined waste in India (e.g., Doron and Jeffrey, 2018). In large part, the waste project revealed how environmental pollution and pathogenicity is shaped and intensified by labour relations, bodily practices and cultural mores as much as by global forces and government interventions. However, far less attention has been given to the human–animal interface, as a key driver of pathogenicity and the emergence of infectious disease. The paper is organised so that it looks at the smaller dumpsites before examining larger ones. Rather than merely viewing these sites as case studies, such scaling up also allows for new insights to emerge when considering the qualities and intensities of odour that surround waste in its varied states (solid, liquid and gas), and its connection to multi-species ecologies.

## 2 | ZOONOSIS AND ECOLOGICAL DISRUPTION

One term that has repeatedly captured news headlines is 'zoonosis': a disease transmitted to humans from animals. Zoonoses are of course as old as human settlement itself, especially as a result of more frequent contact with the nonhuman world, and our co-evolution with pathogens. But the COVID-19 pandemic has raised the spectre of zoonoses to new transnational heights, sparking vehement debates

about the wildlife trade and ecosystem disruptions. This is attributed to a phenomenon epidemiologists call the ‘zoonotic spillover’. Quammen (2020) succinctly captures the process:

We cut the trees; we kill the animals or cage them and send them to markets. We disrupt ecosystems, and we shake viruses loose from their natural hosts. When that happens, they need a new host. Often, we are it.

There are many implications to this ‘spillover’ that lie outside the domain of health. The Coronavirus has magnified racial divides, targeting particular spaces and nations, such as China's wet markets and India's fraught labour relations and religious prejudice (Doron, 2020). And yet, as many have long observed, zoonoses have been an intrinsic part of a global system of animal husbandry—wild *and* domestic—itself tied to diverse and often overlapping food production and distribution systems (see Zhan, 2005). Nevertheless, few studies have looked at the ‘back end’ of these processes, that is, the role of waste and waste management in the spread of pathogens. The result is a lamentable gap in our understanding of infectious diseases, pathogenicity and its relation to complex human and nonhuman agents, which is tied to wider economic, cultural, social and political imperatives. This paper aims to fill that gap. To look at waste through this prism of multispecies relations is instructive on several counts. It reveals how more-than-human agents are implicated in labour regimes, consumer habits, cultural ideologies and public health policies, to name a few. Dumpsites involve a complex network of actors—waste-pickers, government officials, local residents—all interacting to various degrees with the nonhuman domain, from cows, vultures, dogs and pigs to insects and microbes. The rubbish dump, I argue, offers a olfactory map through which such multiple ties are revealed to undermine a narrow epidemiological definition of zoonoses and pathogenicity, while directing attention to the symbolic, material and ideological relations that constitute and amplify the emergence of a disease (Hinchliffe et al., 2017, p. 13).

### 3 | STUDYING THE MORE-THAN-HUMAN

With the explicit aim of decentring the human, multispecies studies have sought to focus on the role of animals, plants, worms and even microbes as key actors, with varying degrees of subjectivity, agency and intention (Fijn, 2011; Govindrajan, 2018; Kavesh, 2019; Lorimer, 2016; Narayanan, 2017, 2019; Paxon, 2018). As Govindrajan (2008, p. 20) put it in her masterful ethnography of animal life in the Himalayas, we need ‘to treat animals, human and nonhuman, as coparticipants in meaningful worldling’. Such worldling practices and meaningful social relations encompass both cultural representations and economic practices, as is the case with the ‘sacred cow’, a central figure in anthropological debates around symbolic and material explanations (e.g., Adcock and Govindrajan, 2019; Korom, 2000). In this paper, the cow will also figure prominently, although her divine authority will be matched by a more ‘profane’ existence: the subject of biopolitical interventions of governmentality, and a scavenger inhabiting India's proliferating urban dumpsites.

Within the burgeoning literature on human–animal relations, the dumping ground is rarely examined. This is especially curious, given that garbage dumps and landfills in industrialising countries across Asia, Africa and Latin America all feature salvage economies that involve more-than-human agents. Indeed, dumpsites are known to be rich animal habitats, with birds, bovines and pigs, amongst others, thriving on the organic waste and insects available (Plaza and Lambertucci, 2017, p. 12). Garbage dumps are also primary sites for vector-borne diseases and zoonoses (Krytosik *et al.*, 2020), where chemical toxins intermingle with decaying matter, replete with pathogens and microorganisms leached and released into the environment and atmosphere. As I will show, identifying and containing

such atmospheric disturbances as smell and smoke is inseparable from more-than-human epistemologies and the sensing subject. Any efforts at domesticating smell, and its recalcitrant agents (human and nonhuman), are thus intimately linked to multispecies relations, as much as they are to the political economy of waste and its enduring legacy—the landfill.

Doherty's (2020) recent anthropological study of a landfill in the Ugandan city of Kampala is a notable intervention into waste and human–animal relations. His article sheds light on the unanticipated effects and power asymmetries that structure relations—formal and informal, human and other—on a garbage dump. Focusing on marabou storks as key participants in the landfill, operating alongside a range of actors, Doherty locates the birds' proliferation in the changing political economy of the country; that is, the implementation of structural adjustment policies in Uganda during the 1990s, which led to the spread of urban slums. The birds that lost their feeding habitats due to urbanisation and deforestation were thus forced to adapt to new circumstances, altering their migration patterns and reproduction habits to feed on the continued waste generated in the city of Kampala and its surroundings. Doherty (2019, p. 324) highlights the birds' valued contribution to the city's waste economies and public health, as part of what he sees as the 'animal infrastructure' serving the city. Yet his focus on the political economy of salvage is less attentive to diverse forms of life and places. It examines a single landfill and category of species—the marabou stork—and its scavenging behaviour as mediated by human materiality and political economic forces in Kampala. By examining garbage dumps as dynamic, and smellscape that index those, I also look at the production, consumption, distribution of waste (organic and nonorganic) and its ties to labour relations, cultural ideologies and institutional arrangements. My aim is two-fold: firstly, to provide further insights into changing human–animal–microbial relations, pathogenicity and infectious risk in India. Secondly, I show how the materiality of waste and human and nonhuman relations are often perceived and experienced through olfactory information, mediated by cultural sensibilities and biological capacities.

## 4 | ANIMAL ENCOUNTERS

India's dumpsites are varied in type and size. At the local level, the life of a rubbish heap begins as little more than a mound, loosely concentrated in a common area of a neighbourhood. In the neighbourhood (*Assi Mohalla*) where I lived in the city of Varanasi in the early 2000s there were several such designated garbage spots for unsegregated waste (*kuuda-kachra*; Figure 1).

Everyday life was punctuated with animal encounters of different kinds, on the way to work, visiting friends or other outings. In most cases, this meant carefully manoeuvring around the 'landmines' left by the bovines, or worse, having to jump aside to avoid the 'real time' splatter. In the wet season, such challenges were magnified, with a risk of sliding and hurting yourself on slimy dung. But such everyday encounters with the nonhuman world in Varanasi were relatively easy to accommodate, even for foreign visitors.

Most goats and roaming bovines that frequented the neighbourhood dump had owners, who released them during the day to forage on waste. The animals would usually find their way back home by evening. These animals had certain everyday routines, with predictable pathways and intentions. This led to some heartening long-term relations, where one would witness acts of affection towards the animals, like regular feeding sessions. A common practice across rural India, and also in Varanasi, was that the first piece of bread (*roti*) made in the day would be reserved for the cow, with the last piece given to a dog. In addition, locals, and especially women of the households, often kept scraps to feed roaming cows in our neighbourhood. Such relations were thus inflected by gender, household relations and practices, but also structured along religious and caste lines. For instance, dumps in



**FIGURE 1** Local neighbourhood rubbish pile, just outside the local temple, in Assi neighbourhood, Varanasi. Image by Doron, 2016

Muslim-dominated neighbourhoods featured different materials, in particular more meat. People often commented that this was the reason Muslim localities attracted more rats and dogs, whereas cows tended to roam in neighbourhoods predominantly populated by caste Hindus.<sup>2</sup>

In Assi neighbourhood, cows would routinely arrive at certain upper-caste houses to be fed leftover food at specific times. One cow would even knock on the door of my friend's residence, to which his mother would cheerfully announce, 'Nandini has come to visit,' and proceed to give her foodscraps. Food leftovers formed part of a set of intimate and affective human–animal ties, both with singular animals, like Nandini, and a class of animals like sacred cows: revered and protected. As a friend observed:

For us giving to cows is a religious act, because you are doing it to increase the family of cows. In Banaras [Varanasi] it's more special because it is the city of Lord Shiva and the bull is his vehicle. So by feeding bulls you gain more merit. But nowadays bulls and cows are far less because government policies are changing, pushing out all cattle farmers to the outskirts of the city. The owners are asked to get their cattle registered also, and you need to punch the ear of your cattle and if it's found roaming you will get fined. (April, 2016).

Similar forms of relatedness are analysed by Govindrajan (2018) in her ethnography of Himalayan village life and animal relations. She notes 'how reflexive exchanges between *particular* humans and animals, facilitated through an embodied, touchy-feely, language of mutual recognition and response, were crucial to their constitution as subjects' (p. 18). Yet recent processes mean that animals, and especially cows, are facing steady evictions from Indian towns and cities. This is in large part the result of rapid



urbanisation, beautification programs and sanitation campaigns—what Narayanan (2017) describes as anthropocentric biopolitical interventions. These interventions have led many animals to lose their habitats, with human–animal relations taking a very different route. That is, biopolitical projects are aimed at improving the population and maintaining public health, in part by promoting waste management and encouraging olfactory neutral spaces (see Doron, 2016). Yet under such schemes free-roaming animals are excluded, viewed as a problem: rummaging through garbage and defecating in the open. This leaves many vulnerable to state interventions and disease, an issue I turn to next.

## 5 | SACRED COWS, ROADSIDE DUMPS AND SCAVENGING VULTURES

India's consumer boom and changing lifestyle choices post 1990 fuelled a growing demand for material goods and animal produce. Consumer and industrial waste could no longer be effectively dealt with by existing arrangements. Waste was becoming a grave public health issue and a blight on the nation's image. In an effort to address these concerns, the modern Indian state launched successive sanitation drives to 'clean and green' India's towns and cities.

One of the most contradictory effects of these campaigns involved animal evictions and conflicts, especially in regards to cows (Narayanan, 2017). On the one hand, clean-up campaigns considered roaming cattle as a traffic hazard and a public health concern, which needed to be forcefully removed. On the other hand, the ruling party was publicly committed to protecting India's paramount symbol: the sacred cow. Reconciling the two approaches to animals became a contentious issue. Cows were increasingly seen as an unfit and undesirable feature of modernity's new waste-management measures. At the same time, how to handle the millions of unproductive street cows became a source of great cultural angst and political interest.

Hindu vigilante groups, claiming to be 'protectors of the cow' (*gaurakshas*), lobbied authorities and politicians to implement nationwide bans on the sale and distribution of beef. Yet these acts meant that communities whose livelihoods and nourishment depended on the cow, like Muslims and members of the lowest castes or Dalits (formerly called 'untouchables'), quickly became the legitimate target of brutal attacks for purportedly violating these restrictions.<sup>3</sup> Ironically, such violence was also enacted on the cows themselves, fuelling a cruel underground economy of cow trafficking across states and external borders, where cattle suffered under terrifying, unhygienic conditions (Narayanan, 2019). As Govindrajan put it, in abstract terms, caste Hindus might revere the cow as sacred, but material and economic concerns often mean that cattle are abandoned on the roadside or secretly sold to butchers (2018, p. 66). In other parts of India, many smallholder farmers are faced with similar dilemmas of what to do with their old, unproductive or sick cows, when recourse to previous arrangements are no longer viable and even risky. Caring for such unproductive cows is a costly affair. While some cattle find reprieve in cow shelters, these can hardly accommodate the millions of cows reported to have been abandoned by their owners (Upadhyay et al., 2018).

The dire condition of these deserted bovines is compounded by the changing nature of rubbish in India. Withnall (2019) poignantly captures this predicament—the figures are startling, with a government survey estimating 'more than 60,000 abandoned cows living in the capital'.

In other towns, the implications of these bans have reconfigured long-standing ritual economies. In Varanasi, for instance, the violent threats of cow vigilante groups, along with government public health programs, means Dalits have refused to handle the carcasses. Animal remains and carcasses are left unattended, dumped in rubbish heaps, rotting and rapidly turning into breeding grounds for disease. Human–animal relations are thus changing to reflect a right-wing brand of

Hindu chauvinism. The situation also indicates a combination of consumer preferences, changing composition of waste, cultural ideologies and public health concerns. Such processes lead to mixed results, in many cases enchaining pathogenicity, as the number of rotting animal remains carrying virulent microbes increases.

Another illustration of these changing multispecies entanglements is the rapid decline of the South Asian vulture (see van Dooren, 2010). These paramount scavengers are often described as keystone species: an animal critical for defining an entire ecosystem. Vultures typically found on roadside dumps and landfills were known to effectively strip clean carcasses in a matter of minutes. In recent decades, the increased and widespread use of a cheap anti-inflammatory drug (diclofenac) to treat bovines in both India and Pakistan has dealt a lethal blow to the population of vultures, who suffer renal failure as a result of ingesting the drug. Once estimated at 40 million, vultures have declined to mere thousands and are now in danger of extinction. The disappearance of vultures from the waste-landscape—their habitat—has had several flow-on effects. First, it has created a vacuum, as millions of carcasses are ‘left rotting, increasing the possibility of the spread of diseases such as TB, anthrax, brucellosis, foot-and-mouth’ and so on (Bindra, 2018). Secondly, it has meant that other animals, especially rats and dogs, fill this vacuum, spreading disease (through their own excreta) and fighting over territory. Together, these have increased the potential for zoonoses, whether directly (bites and animal borne disease), or more broadly, as the volume of unsegregated toxic and decomposing waste creates a perfect breeding ground for zoonotic spillover pathogens.

Across India, haphazard waste management policies, compounded by loss of species, has led to a marked increase in dogs, populating dumpsites. The poor and marginalised communities residing and working beside these garbage dumps and landfills are the most affected. In Varanasi, and many other towns in North India, dog encounters—with packs or individuals—are often a distressing and at times dangerous affair, with reports of over 100 bites a day in Varanasi alone. Street dogs commonly roam around rubbish sites, and many of them display nervous and aggressive behaviour. The famished and often sick-looking canines are not simply responding to humans, but to a varied and shifting environment where other dogs, animals and humans are battling it out for territory and whatever provisions they can retrieve from the local garbage dump (Nadal, 2020, p. 220).<sup>4</sup>

For the marginalised communities of waste-pickers, encounters with street dogs, and their proximity to organic (e.g., rotting waste, animal remains and excreta) and nonorganic waste matter, shapes their everyday experiences of disease and pathogenicity. Such dynamic waste-landscapes feature a number of co-existing species that have had to ‘negotiate trade-offs between foraging benefits and the perception of threats from humans from other animals and inanimate sources’ (Kumar et al., 2019, p. 45). Animals, such as dogs, kites and vultures are said to be far more attuned to smell than other animals and humans. Their olfactory sensitivities are so highly developed that they necessarily shape the way these animals can perceive, sift and negotiate the various garbage terrains. In other words, the fumes of rotting materials, and the smell from flowing organic material, animal life (and faeces) and bacteria, draw these species from long distances to garbage dumps and adjacent localities.

These sites of open dumping and neighbouring localities are also spaces of enduring social deprivation, cultural stigma and state-driven discrimination manifested through an infrastructure that lacks sanitation. The filth and stench of the inhabitants of these urban slums are often remarked upon by people in surrounding areas as places to avoid for fear of diseases. This is particularly jarring, as in the Assi locality many street-side food and *pan* (Betel nut) stalls are commonly located above or near reeking open drains. And yet patrons, many of whom are upper caste, seldom mention the smell and/or health concerns surrounding these spaces. How people experience similar odorous mixtures is often associated with culturally meaningful systems and practices, as the next section illustrates.



## 6 | MAPPING ODOUR

Anthropologist, Joel Lee (2017) examines the intimate connection between social inequality, smell, animals and waste. He looks at how 'spatial practices create smellscape'; effectively enrolling the senses 'in projects of social differentiation', often expressed through the idiom of caste (2017, p. 474). Lee charts the 'olfactory maps' of north Indian cities of Lucknow and Varanasi that serve as beacons for navigating the city and identifying destitute neighbourhoods and Dalit houses, the majority of which are typically located alongside garbage dumps, public latrines and open drains. Odour thus becomes a measure of value, attached to entire communities whose caste, occupational or religious identities are firmly emplaced in the landscape, or *smellscape*.

Such sensory correlations can be traced back to classic Brahminical traditions that designated Dalits as receivers, removers and transmitters of 'pollution' symbolic and real, for hundreds of years. Lee observes that these smellscape were reproduced over time through colonial rule, where upper castes and state actors further marginalised these communities (cf. Chan, 2020; Flikke, 2018). More recently, such exclusionary practices were achieved through a purposeful 'distribution of persons and public functions', like that of Dalit labour living in segregated settlements, ultimately ensuring that the Brahminical design was reaffirmed and maintained. He concludes that the abject labour of Dalits and intimate association with dead and waste matter combine to produce 'chemical "evidence," as it were, of Dalit difference' (2017, p. 479).

In the Dalit settlement near the Assi crossing in Varanasi, stench and cultural sensibilities merged to demarcate these segregated sites, which were considered dangerous and contaminating. The place, known as *Dom-Khana*, or the house of Doms, referred to another Dalit community in Varanasi who were famous as the caretakers of the cremation Ghats of the city. The name stuck even though it was factually wrong, as nearly all the residents in the *basti* (urban slums) belong to the Bhangi and Chamar castes: sanitation and waste workers. My visits to the *basti* were marked by the heavy odorous signature of the settlement that enveloped the area. Open drains (*nalas*) ran through the settlement and the garbage dumps outside it were also designated open-defecation areas for children. Unlike other neighbourhoods, where cows and dogs commonly foraged for food in the neighbourhood dump, in the Dalit *basti*, droves of pigs rummaging through the rubbish dominated.

Cows did not frequent Dalit settlements. This might have been because of the different nature of the Dalit garbage dumps, both their 'lean' composition and the extended time they remained festering and decomposing in the heat. The municipality seldom cleared their rubbish, unless the stench became unbearable or a dignitary visited the area. As elsewhere in India, such crowded and confined *bastis* had little access to government services and infrastructure.

Informants offered several explanations for the absence of bovines in Dalit *bastis*. One suggested that this was simply because Dalit settlements were separate, and members of the cowherder community (Yadavs) lived in other areas. Another explained it in terms of the affection that caste Hindus displayed to cows. Dalits, he said, have not enough food to give, they are poor and 'anyway they don't really care about the cows: after all they eat meat and skin carcasses for a living'. Cows were thus recognised as participants in a ritual economy of human–nonhuman relations, while certain actors were by definition excluded from such relations by virtue of their caste status, occupation and religious background. One of the main aspects these settlements as inherently polluting were their intimate association with waste and pigs as sources of livelihood and nourishment.

The prominent Dalit literary figure Omprakash Valmiki writes about the relations between Dalits and pigs in some of his stories. According to Lee (2015, pp. 16–17), the olfactory dimension of human–pig relations plays a key part in cementing caste prejudice, difference and





exclusion in everyday life. This is borne out in a short story by Valmiki called ‘*Andhar*’ (‘Dust Storm’), in which he describes a young Dalit boy whose daily chores include waking up at dawn to perform ‘the labor of seizing and killing pigs, burning off their hair, and cleaning and butchering their carcasses—work that leaves an olfactory trace on the body of the worker’ (Lee, 2017, pp. 16–17). And yet, despite repeated efforts to scrub himself and rid himself of the odour, the smell sticks, and the boy is shunned by his classmates. The Dalit body is thus recognised and identified, Lee concludes, as ‘a *sign* – a faint whiff of pig flesh – which, in brahminical social ontology, can only mean that he belongs to an “untouchable” community, as only “untouchables” rear and butcher swine’ (2015, p. 15).

So far, I have sought to detail some of the human–animal relations where the ritual domain interacts with everyday practices of marginalisation and exclusion. This is most acutely observed in waste practices and garbage dumps, where more-than-human relations emerge out of and reflect social and material inequities. These are often identified through effluvious cartographies that carry the vestige of historical injustice, divine will and state-driven policies (see Figure 2). Combined, these wasted landscapes frame certain spaces, humans (Dalits) and nonhumans (pigs) as degraded, ‘feral’, diseased and intimately linked to ritual pollution, further legitimising policies, expectations and stereotypes about Dalits and the rights to safety and security of marginalised people. It also renders Dalits more vulnerable to risk, intensifying pathogenicity and exposing their bodies to toxic gasses and bioaerosols (airborne particles of biological origin), commonly released in dumpsites, and causing adverse health effects after inhalation (OSHWiki, 2020). In the next section, I shift the focus from neighbourhood and community dumpsites to larger dumpsites and the risks they pose in a multispecies environment that accommodates humans, animals and microbes.



**FIGURE 2** Pigs at a dump on the outskirts of Varanasi, near an urban slum of waste-pickers. Image by Doron, 2017



## 7 | SMELL COMMUNICATION

In her influential book, *Vibrant Matter* (2010), political theorist Jane Bennet (2010) asks us to consider the capacity of things to affect the world in multiple, unanticipated ways. Bennet's examination of everyday things, forces of nature and even microbes, seeks to emphasise the vitality that exists beyond the human, one that does not only 'impede or block the will and designs of humans', but also acts as a quasi-agent or force with 'trajectories, propensities, or tendencies of their own' (2010, p. 2). Bennet's arguments, often described as part of the 'New Materialism' approach, are instructive for mapping a multispecies entanglement in and around garbage dumps and landfills. Scented geographies are in part a product of chemical and microbial interactions that compel action, attracting or repelling certain actors, such as vultures and dogs that follow the olfactory traces of garbage.

Bennet is not concerned with waste matter directed by economic imperatives (surplus value), projects of governmentality or even cultural constructions ('matter out of place'). Rather, her approach is to magnify the metabolic aspects of waste, as rotting, decomposing, smelly matter. To this end, a landfill is also about cells and microbial agents that take centre stage, and enact it (in common with actor-network theory). Accordingly, drilling deeper into waste reveals it to be vibrant matter, analysed in terms of its unfolding capacities, forces and trajectories that exceed the human. As such waste might instigate action, emit toxic substances or spread pathogens into the environment. Adopting a metabolic lens through which to view garbage foregrounds it as dynamic organism, decaying, generative, alive, spreading fragrances, and communicating the quality of its makeup and surroundings. Landfills are thus sites of bio-physical processes as much as they are of uneven and exploitative material and symbolic relations. In what follows, I examine the dumpsite as a living, breathing, communicating entity in a manner inspired by Bennet, while remaining attentive to how it is co-produced and co-constituted by a range of relations, meanings and actants (human and nonhuman), practiced and configured in varying scales and intensities.

The garbage that had accumulated in our neighbourhood dump in Varanasi would reach the local ward dump, slowly making its way to landfill. Along the way, municipal sweepers would generally have first bids on scanning mixed rubbish and sorting out whatever valuable discards they could salvage for reuse or sale. Then it was the informal workforce of waste-pickers who would rummage through the garbage. The municipal dump was thus a site of segregation and salvaging where 'formal' and 'informal' arrangements operated in tandem. In our locality, one would commonly see a few waste-pickers working alongside dogs, kites, crows and cows foraging on the site (see Figure 2). The odours released from the 'tilled' dumping ground also meant a passer-by would typically cover their nose and stop breathing to try and block the foul smells. Such pungent odours were associated with various forms of 'otherness' inhabiting rubbish dumps, including impoverished low-castes and migrants living and working in its vicinity. Such otherness also included more-than-human forms of life: the myriad animals, sometimes diseased, rabid or feral, as well as bacteria, that drew substance from these dumping grounds. Put differently, if for most citizens the atmospheric disturbances of rotting, foetid material signalled the risk of contamination, revealed through overpowering smell, for 'others' the olfactory traces communicated a more hospitable terrain.

The malodorous atmosphere surrounding dumpsites could be attractive to animals and sustained life in diverse urban settings. Here too human-animal relations are critical. For example, Kumar and colleagues report on Delhi's black kite colonies that thrive as a result of 'inefficient refuse disposal and by religious kite-feeding practices' common among Muslim communities who revere the birds (Kumar *et al.*, 2018, p. 340). This illustrates how material processes and socio-cultural practices mediate, transform and reconfigure multispecies entanglements. And yet, for waste-pickers, handling dead and decaying matter could pose serious risks: from cuts and wounds, to animal bites from insects, rats

and dogs, amongst others. It is the ongoing failure of waste management that creates the most alarming atmospheric disturbance: a long-lasting experience of smell that bears the marks of acute toxicity: grey acrid smoke (Figure 3).

## 8 | SIFTING THROUGH SMOKE

To avoid smell and disease, waste needs to be regularly moved and attended to. In Varanasi the garbage from the ward dumping ground was loaded onto vehicles that carried it to a transfer station, where large trucks would then move the rubbish to an open-air landfill. Such landfills were typically located at the edge of towns or on unwanted land. There the tons of unsegregated garbage were layered on top of millions of metric tons of waste from previous days and months. Yet even when 'laid to rest' in its final destination at the landfill, garbage would hardly remain inert: it not only fermented and stank, it also released combustible gasses into the air, generating fires and thick acrid smoke that enveloped the city of Varanasi (Times of India, 2016).

Smoking landfills were common in India's megacities, some of which sprawled across vast areas and reached disturbing heights. Mumbai's Deonar landfill was one such mountain of garbage that achieved global repute in February 2016 when parts of its 130 hectares (320 acres) caught fire and Mumbai was enveloped in acrid smoke for over six weeks. This meant that the choking fumes continued unabated, an urgent concern for Mumbai's coughing upper-middle classes, let alone for poor waste-pickers living near the dump in crowded and poorly ventilated shacks. For waste-pickers, the smoke presented a serious health risk, with many registering high levels of tuberculosis (Bengali, 2016). Landfills typically release invisible harmful gases and bioaerosols into the air, which are often



**FIGURE 3** Garbage dump near Assi locality, where sweepers, waste-pickers, cows, goats, kites, crows and dogs forage. Image by Doron, 2014





induced by fires and the poor handling and processing of waste materials (OSHWiki, 2020). Such high levels of pathogenicity were intrinsically linked to the socio-material conditions of waste-pickers 'at the frontline' who were eking out a living by extracting value from the Deonar landfill.

Alongside these waste-pickers, animals were also extracting value from garbage in multiple ways. Garbage was a valuable food source and the grounds (and their vicinities) a good breeding and nesting place for a diverse range of vertebrates and insects (see Kumar et al., 2014; Plaza and Lambertucci, 2017). A new materialist approach might also highlight the microbial collaborations taking place at these garbage sites, where an array of vibrant actors direct and constrain material, social and political processes. That is, garbage dumps are host to a range of microbial agents and interactions generated from the renewed flow of nutrients and refuse, bodily fluids (human and animal) and chemical toxins. Together the material processes exceed their constitutive elements to produce uneven and unstable (and at times combustible) connections, often experienced through smellscape and revealed in toxic smoke. These might repel or endanger certain species while attracting or benefitting others; it might alter urban design, and compel governments to act. Waste takes different forms (solid, gas and liquid) creating unpredictable multispecies entanglements, dissolving boundaries, forging new zoonotic pathways and devastating environments, as illustrated in the foetid liquid waste flowing into water bodies in India (Figure 4).

## 9 | THE STENCH OF SUPERBUGS

In recent years, I have made repeated visits to Hyderabad, a city known as the pharmaceutical capital of India. This is part of an ongoing collaborative project seeking to trace the human and environmental costs



**FIGURE 4** Ramna open dump south of Varanasi, with several municipal front-end loaders distributing the waste evenly to try to avoid fire and smoke. Image by Doron, 2018



generated by the pharmaceutical industry, healthcare systems and waste practices (Broom and Doron, 2020; Doron and Broom, 2019). During those visits I was alarmed to see and smell the stench of untreated chemical effluents released by the pharma companies into rivers, lakes and soil. Villagers spoke about how these effluents were routinely discharged under the cover of night, causing locals breathing problems and eye infections. For them a major indicator was the quality of air and chemical vapours released into the night air. It meant people avoided certain areas entirely, some keeping themselves indoors after dark.

Scientists sampling the water bodies in these areas also found that the pharma effluents contained alarming quantities of active pharmaceutical ingredients (see Gandra et al., 2017). This, in turn, was shown to increase the microbial load in the environment, leading to extremely high levels of drug-resistant bacteria or 'superbugs'. Because of the absence of strict government regulation and enforcement over pharma wastewater, little could be done. Yet it was palpably clear to villagers that they and other species within the environment were slowly being poisoned. A former village head elaborated:

You see because of the pollution fish died, migratory birds stopped coming, our paddy fields yield half as much as before. Even our buffalo stop giving as much milk. So, you can buy a buffalo for one lakh rupees (RS 100,000) and she'd initially give you eight to ten litres per day, but after living in our village for six months, the same buffalo will only give two litres per day ... for us people living near the Musi (river), the air, water, food, all is polluted by this. People get skin rashes and women having more miscarriages. (Interview, 17 January 2020).

The different areas of life and the scale at which such slow violence operates is key to appreciating the wide-ranging ecological effects, driven by corporate capital and lax state controls (Nixon, 2011). The former village head clearly recognises the interconnections within the surrounding ecosystem and its impact on multispecies relations. For decades now, the increased risk from untreated effluent has become a defining feature of these people's lives: the visibly foaming rivers, reeking bore wells and nightly stench was proof enough that this was the source of infection and contamination of their environment and bodies. The problem of drug-resistant bacteria spreading because of pharma waste extended across multiple domains, from soil and water sources, to animal bodies and their saliva or faeces, which could be picked up by vermin or other zoonotic pathways.

Garbage dumps, as I have argued, are conducive sites for such zoonotic transfers. The cultural and political economy of these dumps renders them a dynamic site of multispecies contact. Such was the Hyderabad dumpyard, which was particularly striking because of the number and diversity of animals foraging on the site: pigs, buffaloes, dogs, cows, rats, in addition to birds and insects. There were also dozens of vehicles of all sizes, from bikes to large JCB wheel-loaders; and a range of actors (formal and informal) operating alongside each other (see Figures 4 and 5). Dozens of waste-pickers rummaged alongside small municipal trucks (lorries) and three-wheelers, which unloaded tonnes of household waste collected on a daily basis. The waste itself was typical of India, made up of a much higher proportion of food scraps and by-products (wet waste) than are found in other industrial countries. The animals had much to feed on, which also helped the waste-pickers by exposing salvageable materials (see video clip here).

The dumpyard itself was operated by the Greater Hyderabad Municipal Cooperation, but officials seemed to 'tolerate' the informal labour provided by waste-pickers. I was told that certain arrangements were in place so that what waste-pickers recovered (plastic, metal, glass, paper, etc.) had to be sold to two authorised recyclers. The rest of the waste was ferried daily by large trucks to a landfill on the outskirts of the city. According to officials running the dumpyard, an average of 650 tonnes of waste was removed daily. Waste-pickers had to be focused and work fast before the afternoon, when the large trucks were loaded with waste for the landfill.





**FIGURE 5** Waste-pickers, foraging animals and various vehicles at the Hyderabad dump-yard. Image by Doron, January 2020

The day began early, with small lorries arriving from different parts of the city and unloading their municipal household waste. Upon arrival, waste-pickers surrounded the small vehicles and quickly identified rolling articles of value. For them, the wet waste was something that camouflaged items made of plastic, paper, glass and metal, which had recognisable value. Alongside the waste-pickers, hundreds of animals meandered, foraging in between the deep mounds of waste. The larger livestock included a herd of buffalos, pigs and numerous cows. Crows picked through the waste carefully as dozens of dogs sniffed between piles of rubbish for nourishment. ‘During the wet season things are much harder,’ said one female waste-picker. ‘It’s difficult to sift through the waste because it is much heavier and its muddy, there are also lots of mosquitoes and the smell is very strong.’ The woman and her family had migrated from a district northwest of the city because successive droughts had left them out of work. Most workers were migrant labourers who travelled back and forth to the city for work from across the nearby states of Andhra Pradesh and Karnataka. Across India, these rural people formed a steady supply of unskilled labourers, many of whom lived and worked in settlements near the piles of rubbish generated by a burgeoning consumer middle class. In the Hyderabad dumpyard the majority belonged to the Valmiki community, a Dalit subcaste (*jati*).

The labour was backbreaking and risky, but as one waste-picker explained, she actually preferred this line of work to any other. It gave her a degree of independence that was difficult to find elsewhere, she said. Her day began at five am and was finished by two pm, after which she could rest and do her daily chores. This autonomy was something she cherished. Other waste-pickers working in the dumpyard, most of whom were women, spoke more about the hazards of the work, and described common accidents and ailments; respiratory and various other infections were common. To avoid injuries, almost all used a paint roller handle that served as a hook for raking and sieving through the ever-replenishing mounds of waste. Most carried white polypropylene sacks containing stuff they’d managed

to salvage throughout the day. None used protective equipment, although the government officers running the dumpyard did show me the gloves and masks they had when we visited their office block: a demountable one room container overlooking the dumpyard.

When asked about the numerous animals foraging alongside them, several waste-pickers responded that they weren't a big bother. What was clear was that the cattle, both buffaloes and cows, were owned by smallholder dairy farms operating nearby, who routinely released them to graze on the site. The pigs too, I was told, belonged to a Dalit family living in a *basti* in the area. The dogs were familiar cohabitants and the dumpsite was their territory. Cattle were used for milk and meat (buffalo), and the pigs were used for slaughter (Figure 5).

The scene that at first glance appeared and smelled like an informal 'free for all' dumpsite was in fact far more structured. Most waste-pickers were registered in the office, as were the various vehicles and the amount of waste carried out to the landfill on a daily basis. These urban recesses of bad smells warranted the attention of the authorities who regulated the flow and distribution of waste and the livelihoods of those sustained by it. The open waste dump brought together feral and domesticated animals that grazed and cohabitated with insects, microbes and people, whose caste and professional status might have rendered them as 'less than human', but also revealed that such human–animal relations were marked by intent, agency and design. The cattle were brought there by their owners and foraged for food alongside other animals—including dogs and birds. The lines between wild and domestic animals were blurred and formal structures of the state interacted with the informal labour of waste-pickers. The dumpsite was the site of an assemblage of multiple relationalities, involving processes, interconnections and turbulence that collapsed crude distinctions of rural and urban, social and material, consumption and production. This was further evidenced by the unfolding capacities of more-than-human agents to travel and contaminate environments that extended far beyond the dumpyard.

## 10 | 'GOOD MEDICINE'

While I was unable to meet the farmers who released their livestock to forage on the dumpsite, I did have the opportunity to visit several similar smallholder farms in the area, all of which sold their milk to local retailers. I was struck by the arsenal of antibiotics these farmers gave their cattle, with little knowledge of their names or function. I was told that these were simply 'good medicines' purchased at the local pharmacy (over the counter) to treat the animals for loss of weight or appetite, infections and common ailments. Only if the animals' health deteriorated significantly would they call a veterinarian.

My anecdotal impressions of such antibiotic use are confirmed in a recent article which found that smallholder farms routinely misuse antibiotics to treat their livestock. Such smallholder farms, the study observes, make over '80% of all cattle holdings in India ... and account for over half of total [milk] production' (Chauhan et al., 2018, p. 1).<sup>5</sup> The researchers point out that because of lack of knowledge and government regulation farmers are simply following their peers in treating their livestock based on the advice of unlicensed veterinarians, pharmaceutical representatives and village heads. The findings are conclusive: the prolific misuse of antibiotics for treating farm animals is fuelling the potential risk of antimicrobial resistance (Chauhan et al., 2018). This is supported by multiple studies from South India that also cite alarming rates of multi-drug resistance on smallholdings (Ganguly, 2011). The Chauhan study notes how rapid urbanisation and changing land-use patterns means farmers operate their smallholder farms in peri-urban areas, in order to meet the unprecedented demand for milk products. Yet there is no mention that in the absence of land, livestock are often sustained on waste, grazing in dumpsites, which further fuels the cycle of infection and pathogenicity.



As already mentioned, dumpsites contain animal remains and faecal pathogens interacting with organic and inorganic material. These menacing microbes travel in the atmosphere, stubbornly surviving extreme weather, and cause severe infections and respiratory diseases (OshWiki, 2020). Dumpsites are also a terrain where exposure to injuries, cuts, bites and toxic fumes and bioaerosols is common. While waste-pickers salvage dry waste for recovery in the municipal dumpyard, this household waste is far from benign. A recent study in Delhi revealed that tonnes of discarded medicines reach the city's major river, the Yamuna, and one of its largest landfills, Ghazipur (Velpandian et al., 2018). Analysing water samples from these sites, a team of scientists found alarming concentrations of drugs, such as the banned painkiller for treating livestock, diclofenac (lethal to vultures), and several commonly used antibiotics. 'This means,' concluded the lead scientist, 'that a lot of unused drugs, expired or not, are thrown into dustbins, end up at the landfill, and from there percolate into the local drains and finally end up in the Yamuna' (Jha, 2018). Animals grazing on such 'medicated' matter in dumpsites—large and small—are therefore susceptible to developing drug-resistant bacteria, passing it on through their milk, meat, saliva and excreta. These dumpsites are thus a key reservoir for resistant bacteria and a source of zoonotic spillover pathogens. Further, it is marginalised communities like Dalits who have regular contact with animals, dead or alive, which renders their bodies especially vulnerable, as they are 'embedded in the world of microbes (with its relationship to waste)' (Chakrabarty, 2018, p. 15).

Waste matter and dumpyards are enmeshed in a complex web of actants; entangled (and manipulated) in a context of deeply unequal relations and resources (chemicals, methane, drug resistant bacteria) that amplify zoonoses and enhance pathogenicity. These webs or assemblages combine different processes, from urbanisation, consumerism and policy directives to those of globalisation, inevitably affecting the nature of waste itself. Taken together, these processes and their effects have reconfigured more-than-human relations and transformed environments.

## 11 | CONCLUSION

Throughout this paper I have sought to shed light on complex dimensions of multispecies relations from the vantage point of waste and dumpsites, small and large. Drawing on fieldwork in Varanasi I examined the dynamic human–animal relations in a city undergoing rapid urban change. One way to track these social changes is through the smell that is spread and experienced in the diverse settings and practices. My focus has been the nexus between the garbage, the human and the non-human that marks the city and the odour associated with particular spaces and matter. Stench is predominantly experienced as source ritual pollution and risk, linked to enduring cultural sensibilities, ideas about pathogenicity and an exclusionary cultural politics. And yet it is also a source sustenance for many actors, human and nonhuman, and for whom such foetid waste-landscapes are spaces of nourishment, reproduction and labour, shaped by power relations and complex biocultural processes. Further, these odorous landscapes are a major reservoir and source for zoonotic spillover, a result of ineffective waste management practices, loss of biodiversity, and a vast increase in the volume of contaminated waste—organic and nonorganic.

These risks are also evident in the dispersal and condensation of smells: the atmospheric disturbances that signal uncertainly, disease and the failure of the authorities to properly manage waste. Such stench and rancid smoke may be released into the air with differential intensity and density, detectable to humans or not, afflicting, attracting or repelling certain communities and animal life. The smell of rotting waste leaches and releases odours into the land and atmosphere.

Odour might stimulate physiological reactions. It is sensed and recognised by different species, serving as a medium of perception, thought and knowledge about the world, blurring the boundaries between the biological, cultural and political (see Brawich, 2020).

At a more general level, India's changing urban landscape, growing demand for consumer products, antibiotic-rich environment and lax regulations has had significant bearing on the human–animal–microbial interface. The mishandling of waste and effluents is known to leach toxins and pathogens into the soil and water bodies, and release an array of hazardous bioaerosols, chemical dust and smoke into the atmosphere. The role of waste (and its changing composition) and the cultural politics around waste management, I have argued, is key if we are to better understand the growth of pathogens, infectious disease and zoonotic transfer.

In an effort to prevent and manage pathogenic zoonotic spillover, common practices include culling and vaccination programs across susceptible species, like pigs, goats, cows and dogs. Yet, if we are to detect and control zoonotic pathways we need to understand the flow of pathogens as part of wider disease ecologies that cannot be reduced to one or other species or pathogen. Rather, zoonoses are inherently relational, tied to a complex assemblage that forgoes untannable binaries of human/nonhuman, wild/domestic, formal/informal or global/local. A scented understanding of pathogenicity and zoonoses through the lens of waste and multispecies interactions is therefore instructive and potentially useful. The latest reports of dogs trained to detect bodies emitting the disease harbouring Coronavirus is the latest illustration of how olfactory traces spill beyond the neat boundaries of the body. We are reminded that just as the smell of rotting waste can prompt strong physiological reactions and cultural interpretation, at other times and places odour can be productive for eliciting information about our multispecies world and the choices we make.

## ACKNOWLEDGMENTS

This work was supported by the Australian Research Grant under GRANT DP 190100823. I am grateful to my research assistant Pinku in Varanasi. In Hyderabad, Maya Shrivanthi provided excellent guidance, translation and advice. I also want to thank Owen Bullock for his help and comments, the editors of this issue and the anonymous reviewers for their useful suggestions.

## ORCID

Assa Doron  <https://orcid.org/0000-0002-9245-7598>

## ENDNOTES

- <sup>1</sup> Here I use the term 'actant', as commonly deployed in actor–network theory and new materialism.
- <sup>2</sup> The accuracy of these claims, however, is doubtful and may be underpinned by religious and political overtones. Dog population size involves a range of factors that cannot be reduced to simply the make-up of garbage, for instance, housing density, the presence of food establishments and effective municipal sanitary services (see Bhalla et al., 2020).
- <sup>3</sup> Dalits are a diverse group, composed of hundreds of subcastes (or *jatis*). They speak a variety of languages in different parts of India and they have among them a small middle class.
- <sup>4</sup> Narayanan (2017) offers a more nuanced reading of dog–human relatedness that cannot be reduced to simply pathologising these animals as 'feral dogs'. For example, when the presence of dogs offers security to a marginalised population.
- <sup>5</sup> We know that a staggering 95% of India's milk producers own just one to five animals per household, and these workers include a large number of landless labourers, but the exact figure is unknown (Government of India, 2018).





## REFERENCES

- Adcock, C. & Govindrajan, R. (2019) Bovine politics in South Asia: rethinking religion, law and ethics. *South Asia: Journal of South Asian Studies*, 42(6), 1095–1107.
- Bengali, S. (2016) *18 stories high and still burning. fire at landfill exposes India's growing trash crisis*. Available at: <http://lat.ms/22Ji1SJ> [Accessed 1 June 2020]
- Bennet, J. (2010) *Vibrant Matter: A Political Ecology of Things*. North Carolina: Duke University Press.
- Bhalla, S., Kemmers, R., Vasques, A. & Vanak, A. (2020) 'Stray appetites': a socio-ecological analysis of free-ranging dogs living alongside human communities in Bangalore, India. <https://doi.org/10.1101/2020.07.19.210617>
- Bindra, P. (2018) *Declining vulture population can cause a health crisis*. Available at: <https://bit.ly/2SRXIou> [Accessed 6 May 2020]
- Brawich, A.S. (2020) *Smellosophy: What the Nose Tells the Mind*. Cambridge, MA: Harvard University Press.
- Broom, A. & Doron, A. (2020) Antimicrobial resistance, politics, and practice in India. *Qualitative Health Research*, 30(11), 1684–1696.
- Chakrabarty, D. (2018) The Dalit body: A reading for the Anthropocene. In: Hasan, Z., Huq, A., Nussbaum, N. and Verma, V. (Eds.) *The Empire of Disgust: Prejudice, Discrimination, and Policy in India and the US*. Oxford: Oxford University Press, pp. 1–20.
- Chan, K. (2020) Politics of smell: constructing animal waste governmentality and good farming subjectivities in colonial Hong Kong. *Environment and Planning C: Politics and Space*, 38(6), 1–20.
- Chauhan, G., Chatterjee, M., Lindahl, J., Grace, D. & Kakkar, M. (2018) The social biography of antibiotic use in small-holder dairy farms in India. *Antimicrobial Resistance and Infection Control*, 7(60), 1–13.
- Cohen, E. (1988) The broken cycle: smell in a Bangkok soi (lane). *Ethnos*, 53(1–2), 37–49.
- Doherty, J. (2019) Filthy flourishing: para-sites, animal infrastructure, and the waste frontier in Kampala. *Current Anthropology*, 60(S20), S321–S333.
- Doron, A. (2016) Unclean, unseen: social media, civic action and urban hygiene in India. *South Asia: Journal of South Asian Studies*, 39(4), 715–739.
- Doron, A. (2020) *India's Corona casualties*. Available at: <https://insidestory.org.au/indias-corona-casualties/> [Accessed 4 May 2020]
- Doron, A. & Broom, A. (2019) The specter of superbugs: waste, structural violence and antimicrobial resistance in India. *Worldwide Waste: Journal of Interdisciplinary Studies*, 2(1), 1–10.
- Doron, A. & Jeffrey, R. (2018) *Waste of a Nation: Garbage and Growth in India*. Cambridge, MA: Harvard University Press.
- Fijn, N. (2011) *Living with Herds: Human-Animal Coexistence in Mongolia*. Cambridge: Cambridge University Press.
- Flikke, R. (2018) Domestication of air, scent, and disease. In: Swanson, A., Lien, M. and Ween, G. (Eds.) *Domestication Gone Wild: Politics and Practices of Multispecies Relations*. North Carolina: Duke University Press, pp. 176–195.
- Gandra, S., Joshi, J., Trett, A., Sankhil Lamkang, A. & Laxminarayan, R. (2017) *Scoping Report on Antimicrobial Resistance in India*. Washington, DC: Center for Disease Dynamics, Economics & Policy.
- Ganguly, N. (2011) *Situation Analysis: Antibiotic Use and Resistance in India*. New Delhi and Washington, DC: The Centre for Disease Dynamics, Economics & Policy.
- Government of India. (2018) *National Action Plan for Dairy Development Vision-2022*. Department of Animal Husbandry, Dairying & Fisheries, Ministry of Agriculture Farmers Welfare.
- Govindrajan, R. (2018) *Animal Intimacies: Interspecies Relatedness in India's Central Himalayas*. University of Chicago Press: Chicago.
- Hinchliffe, S., Bingham, N., Allen, J. & Carter, S. (2017) *Pathological Lives: Disease, Space and Biopolitics*. Oxford: John Wiley & Sons.
- Jha, D. (2018) *Antibiotics you throw away may be breeding superbugs*. Available at: <https://bit.ly/34HEngU> [Accessed 24 August 2020]
- Kavesh, M. (2019) Dog fighting: Performing masculinity in rural South Punjab. *Pakistan, Society and Animal, Journal of Human-Animal Studies*, 27(2), 1–19.
- Korom, F. (2000) Holy cow! The apotheosis of Zebu, or why the cow is sacred in Hinduism. *Asian Folklore Studies*, 59(2), 181–203.



- Krystosik, A., Njoroge, G., Odhiambo, L., Forsyth, J., Mutuku, F. & LaBeaud, D. (2020) Solid Wastes Provide Breeding Sites, Burrows, and Food for Biological Disease Vectors, and Urban Zoonotic Reservoirs: A Call to Action for Solutions-Based Research. *Frontiers in Public Health*, 7, 1–7. <https://doi.org/10.3389/fpubh.2019.00405>
- Kumar, N., Gupta, U., Jhala, Y. V., Qureshi, Q., Gosler, G. & Fabrizio, S. (2018) Habitat selection by an avian top predator in the tropical megacity of Delhi: human activities and socio-religious practices as prey-facilitating tools. *Urban Ecosystems*, 21, 339–349. <https://doi.org/10.1007/s11252-017-0716-8>
- Kumar, N., Mohan, D., Yadvendradev, V., Qureshi, Q. & Sergio, F. (2014) Density, laying date, breeding success and diet of black kites *milvus migrans govinda* in the city of Delhi (India). *Bird Study*, 61(1), 1–8.
- Kumar, N., Singh, A. & Harris-White, B. (2019) Urban waste and the human–animal interface in Delhi. *Economic and Political Weekly*, 54(47), 42–47.
- Lee, J. (2017) Odor and order: How caste is inscribed in space and sensoria. *Comparative Studies of South Asia, Africa and the Middle East*, 37(3), 470–490.
- Lorimer, J. (2016) Gut buddies: multispecies studies and the microbiome. *Environmental Humanities*, 8(1), 57–76.
- Nadal, D. (2020) *Rabies in the Streets: Interspecies Camaraderie in Urban India*. Pennsylvania: Penn State University Press.
- Narayanan, Y. (2017) Street dogs at the intersection of colonialism and informality: ‘Subaltern animism’ as a posthuman critique of Indian cities. *Environment and Planning D: Society and Space*, 35(3), 475–494.
- Narayanan, Y. (2019) Jugaad and informality as drivers of India’s cow slaughter economy. *Environment and Planning A: Economy and Space*, 51(7), 1516–1535.
- Nixon, R. (2011) *Slow Violence and the Environmentalism of the Poor*. Cambridge, MA: Harvard University Press.
- OshWiki. (2020) *Exposure to dangerous substances in the waste management sector*. Available at: <https://bit.ly/3l7QZnv> [Accessed 24 August 2020]
- Paxson, H. (2008) Post-Pasteurian cultures: the microbiopolitics of raw-milk cheese in the United States. *Cultural Anthropology*, 23(1), 15–47.
- Plaza, P. & Lambertucci, S. (2017) How are garbage dumps impacting vertebrate demography, health, and conservation? *Global Ecology and Conservation*, 12, 9–20.
- Quammen, D. (2020) *We made the Coronavirus epidemic*. Available at: <https://www.nytimes.com/2020/01/28/opinion/coronavirus-china.html> [Accessed 3 March 2020]
- Times of India. (2016) *Waste accumulates as locals protest dumping at Ramna*. Available at: <https://bit.ly/2QxrddZ> [Accessed 26 June 2020]
- Upadhyay, A., Parija, P. & Sood, K. (2018) *India’s sacred cow now threatens an \$83 billion dairy industry*. Available at: <https://bloom.bg/3lw7s4M> [Accessed 31 March 2020]
- van Dooren, T. (2010) Pain of extinction: the death of a vulture. *Cultural Studies Review*, 16(2), 271–289.
- Velpandian, T., Halder, N., Nath, M., Das, U., Moksha, L., Gowtham, L. & et al (2018) Un-segregated waste disposal: an alarming threat of antimicrobials in surface and ground water sources in Delhi. *Environmental Science Pollution Research (International)*, 25(29), 29518–29528.
- Withnall, A. (2019) *Inside India’s plastic cows: How sacred animals are left to line their stomachs with polythene*. Available at: <https://bit.ly/3luRB6M> [Accessed 26 June 2020]
- Zhan, M. (2005) Civet cats, fried grasshoppers, and David Beckham’s pajamas: unruly bodies after SARS. *American Anthropologist*, 107(1), 31–42.

**How to cite this article:** Doron A. Stench and sensibilities: On living with waste, animals and microbes in India. *Aust J Anthropol*. 2020;00:1–19. <https://doi.org/10.1111/taja.12380>