INDIA'S INFORMAL WASTE ECONOMY AND URBAN INFORMALITY: AN ILLUSTRATED TOUR OF THE EPISTEMOLOGICAL HORIZON

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Waste is one of the fastest growing physical parts of the Indian economy. India generates about 2.6m tonnes of solid waste a day, roughly a third each from agriculture, industry and domestic consumption (Centre for Environmental Education (CEE), 2014, p4). India's 'peak waste', the future point beyond which resource efficiency will drive a decline in absolute waste generation, is predicted to take a century to reach (Hoornweg et al, 2013). Meanwhile the contribution of waste to the material balances of the economy will rise. India has also long had the largest informal economy in the world: about two thirds of GDP and over 80% of all non-agricultural livelihoods. This informal economy is the major driver of growth and jobs.[i].It has been the object of much research and many reviews.[ii]

Alongside the unprecedented physical proliferation of waste, new and heterogeneous subfields in the study of waste are rapidly forming, drawn from the disciplines of geography and planning, engineering and management, sociology and political ecology, gender studies and research-activism. What follows is a preliminary and selective review of some answers offered by these new literatures to two questions which link India's informal waste economy (IWE) with India's urban informality in general. First, what does research on urban informal waste contribute to our understanding of

urban informality? And second, what does research on urban waste policy contribute to the literature on the informalisation of policy? I also indicate, in summary form, the contribution of my own field-based research to these two literatures: the informal waste economy and the informalisation of policy processes for waste. Since a picture is worth a thousand words, beneath this review is a photo gallery of a small-town waste economy, mainly in 2015-16, organised through its circuits of waste-production.

1. The Informal Waste Economy and the Informal Economy

1.1.Concepts of waste and its role

Waste is the material by-product of human activity for which an economic use has not yet been found. Its owners have renounced their property rights and it has zero or negative use-value.[iii] The process of 'wasting' (O'Brien, 1999a), of 'dissipation' (Gidwani 2013) is a moment of variable duration in the natural cycles of matter and energy, of which the commodity form is a relatively brief instance. In cities, waste is both socially and metabolically transmuted in path-dependent ways which need to be understood in their specificity and complexity.[iv] Society cannot reproduce and develop without managing this public record of its material, metabolic habits.[v] So waste is also central to the reproduction of the social order and to its dynamic expression in urban space.[vi] When in any society waste is not only marginalised but deliberately made invisible, conceptually and practically, as it is in India, it tells us a lot about the social frontiers between inside and outside, purity and pollution, 'us' and the 'other'.[vii] Waste is also increasingly hazardous (e-waste chemically; human and medical waste physically through sharps and microbially). Some waste then gains economic value through sale for re-use or recycling. What Marx called the 'reconversion of the excretions of production' [viii]: the generation, recognition and classification of waste, the transformations of its value and the 'placing' [ix] of waste in the commodity economy are not just fields of conflict over physical matter [x], they also involve conflicts over technological, material,

cultural and symbolic concepts which are shifting over time.[xi] So much so that one epistemological characteristic of the new literature on waste is that its classifications and meanings follow such a wide range of principles that they defy concepts of sector or 'system'.

How do we know what we know about the urban IWE? Given the lack of official data, case studies are essential and permit statements about relations and processes while not permitting quantitative extrapolation to higher scales (Flyvbjerg, 2006).[xii] Exceptionally rich in field evidence, the emerging literature consists mainly of a wide range of case studies in big cities. The urban is equated to the city. Some of these studies are set within individual disciplines but many span several, and look at waste in terms of a wide range of categories, for example i) 'sector' ('scrap', plastic, metal, skin, paper, transport); ii) types of worker (notably 'scavengers' and waste-pickers[xiii] – a socially, occupationally and economically differentiated category of 'waste people'); and iii) place (housing colonies, wards, streets, dumps, neighbourhoods and their economies). Waste is usually characterised as part of the 'infra-economy', which is variously seen as organised by hierarchies; by systems (socio-economic metabolic systems/ecosystems, socio-technical webs, segmented by different kinds of 'back-end infrastructure'); by (value) chains, networks, marketplaces (bazaars), settlements and slums; by varied kinds of firm, households and social organisations; and by gender.[xiv]

Informal waste

How do these multiple approaches analyse the handling of unregistered and unregulated waste? Sometimes, the informal character of the waste economy is so naturalised that its informality is not even mentioned,[xv] or is paraphrased – as it is when termed 'unorganised', or 'unregulated', or when Benjamin (2008) invokes 'occupancy urbanism' or McFarlane (2012) sees the 'architecture of malice' as 'malevolent urbanism' or when Inverardi-Ferri (2017) calls up a 'black' and 'night-time' economy.

The IWE is thus often 'unseen' to those who generate and deposit most of it, but can also prove unforeseen. Hodges characterises the emergence of the informal medical waste economy as 'jugaad', the unexpected hacking into a medical disposal sector for hazardous materials at a moment when a culture of disposability has replaced equipment for re-use. Informal/illegal recycling is incentivised thanks to poor quality and poorly-enforced laws and unpredictable lack of electricity for incineration that characterise the formal channels of disposal of medical waste (Hodges 2017).

Informal waste work

In the new literature, as in popular parlance, the IWE is commonly 'reduced' to the end-product of consumption and the starting-point of reprocessing industries. The labels of 'scavenger', *kabbadiwala*, waste-picker, waste-recoverer or recycling traders [xvi] are terms of art for many kinds of retrievers of consumption waste. This waste is generated in a profligate manner which has been interpreted in two main ways, both of them controversial. Profligacy in wasting is attributed either to a social disposition to defile, or alternatively to the material manifestation of India's caste system (Doron 2016) (interpretations discussed further under 'waste and disorder' below).

Populating the IWE, dominated by self-employment, waste-pickers gather, bulk, separate/'segregate'[xvii] and sell-on into a system of dealers and wholesalers the impure public goods that provide their resources and supply the re-processing industry. [xviii] Some self-employment (private enterprise on the smallest scale) has been described as a process, as in "informal privatisation', 'petty privatisation' or 'privatisation-from-below" (Reddy 2013, p62).[xix] These processes substitute for the shrinking of the organised work-force over the last quarter century – one local estimate is by 40% - while the volume of waste has expanded by between 3 and 10 times.[xx] Waste work is therefore celebrated in the activist research literature for efficiently performing an *informal public service* by recycling. Recycling reduces the volume dumped, thereby reducing pollution and the public costs of disposal, contributing to environmental protection, expanding livelihoods and

incentivising value aggregation.[xxi] Informal self-employment is also seen as an incomplete proletarianisation which subsidises the cost of reproduction of wage-labour; reduces the costs of re-usables and raw materials for informal reprocessing and thus under-writes cheap commodity production.[xxii]

Yet this literature also records waste work as a specially enduring locus of stigma, of caste-stratified oppression, of contracts interlocked through caste inequalities, and of 'patronage and exploitation' intensified by caste - with very occasional instances of countervailing mobilisations [xxiii] (developed under 'the rise and fall of waste' below).

Waste for re-cycling however is estimated as less voluminous than waste for dumping. One type of dumping work, 'manual scavenging', attracts special attention in the literature on informal waste because the practice of removing excreta by hand is illegal [xxiv] and yet about 300,000 households perform this work - mainly women, mainly in N India (Human Rights Watch, 2014). Only about 15% of India's urban human waste is treated [xxv] and wherever it is not treated it is regarded as toxic and infectious.[xxvi] The human excreta to be collected and disposed of is augmented by used menstrual cloths and excreta from urban animals. [xxvii] Much is found mixed with general consumption waste in wet, open, sometimes informal urban drains, and the task of segregating excreta from potential recyclable matter is increasingly one for men as well as women. While Kapur et al (2010) and Prasad (2016) see urban work as sites of caste-liberation and *dalit* entrepreneurship, and Jodhka (2018) suggests India is a 'post caste society',[xxviii] manual scavenging is found to be done almost exclusively by the lowest castes, is exceedingly hard to exit, and is suffused with discrimination at work and outside work, delayed wages, exclusion from access to infrastructure and justice. Non-performance and resistance are punished with threats of violence, denial of access to common property resources like wood-fuel and water, and eviction from homes – even carried out by municipal employers and the police.[xxix]

Although waste work in general is now admitting workers from castes and tribes other than those of lowest status, much of what has just been described refers to the conditions of workers who are employed (informally) by formally registered waste companies and even by local councils and public-sector and private corporations. [xxx]

While the symbolic and practical manifestations of caste also suffuse the regulation of the IWE, as well as its practices, the way the IWE is gendered also illustrates the complex, even ambivalent, modes of ordering the IWE. On the one hand, they perform the most menial of tasks, suffer the most punitive and abusive work conditions, work the longest hours, may take children to work with them, get lower returns or wages and lack organisation. [xxxi] They are least able to make citizenship rights become real for them. They are victims of poor health, at high risk of work-related accidents and of sexual and other kinds of harassment by the police, municipal officials and local residents – in daily reality, dominated by brute force. On the other hand, IWE women may exert agency in the informal allocation of routes, in their division of labour, in sharing the product of work and helping out in adversity. The conditions under which they may also organise and unionise successfully are being researched, notably by WIEGO (Dias and Samson 2016; WIEGO 2017). While the IWE shows in stark form how the social order of gender, caste and class is reproduced, as Chakrabarty noticed in 1992, it also reveals how there is no single set of social rules ordering the waste economy.

In sum

The recent development of the field of waste studies is rich in information and in a dynamic state of competition over concepts - for an analytical consensus has not been consolidated. While its political performativity is for the present far outstripped by its conceptual innovations, IWE scholarship enriches the epistemology of informality. It lends weight to the pardoxical contention that although the term informality has wide currency, the

formal-informal binary is an ultimately unhelpful simplification of the varied sets of unequal and coercive relations of existing capitalism. It supports the position that the IE is not external to the capitalist economy but exists inside as well as outside it. It insists on the physical materiality of political economy. [xxxii]

Our own exploratory research on urban waste, which is reported in detail elsewhere, has examined livelihoods, poverty, social discrimination, its formal and informal sectors and its gendering. [xxxiii] It contributes to the IWE scholarship reviewed here in four ways. First its analytical unit is not (a part of) cities but small towns – of which India has some 7500 – which are severely under-researched. [xxxiv] Second, it sees waste as integrated into both the formal and the informal economy, taking urban waste in its entirety but also disaggregating it and taking its specificity seriously. Third, it responds to the need to visualise and 'map' in addition to the ongoing activity of conceptual innovation and inflation[xxxv] (reviewed above) by organising the WE conceptually through the circuits of capital, integrating the production of waste with production from waste (Suryaprakash, 2014) – see Table 1 here. Even so, resource constraints prevented us from following waste outside the formal territorial boundary of the town. [xxxvi]]

Table 1: Circuits of Waste Production in a small IndianTown

Attributes	Small Town Waste Economy: Circuits of Production of Waste							
	1.The production of labour: human and animal waste excretions	2.Waste Produced in Commodity Production	3.Waste Produced in Physical Circulation		4.Waste Produced from Consumption	5. Waste Produced in the Reproduction of Urban Society		
			In Transport: Labour and Freight (raw materials & commodities)	In Commodity Marketplaces		Hospitals: Public & private	Meals Hotels; Wedding Halls; Canteens	Liquor Shops
Typical sites	Everywhere: a. Public space: 1. on verges, spare /common land, alleys, gulleys; 2. 'enclosed' public lavatories; b. Private spaces (inside all buildings & adjacent to them)	Factories	Roads and railways	Market spaces, verge sides; clusters of shops	Throughout the town	Concentrated activity on sites dispersed through town	Dispersed urban sites; wedding halls clustered	Dispersed through town
Form	Solid & Liquid	Solid & Liquid	Solid & Liquid	Solid	Solid, Semi-liquid, mixed	Solid & Liquid	Solid & Liquid	Solid
Decomposit-ion potential	BD, hazardous to health on verges and open drains	1. NBD (S) Clothing accessories factory (plastic; metal) 2. BD (S) Rice Mill (broken/bad grain, bran, husk 3. BD (L) Industrial Alcohol (molasses sludge)	NBD; BD	NBD; BD	BD but mostly NBD	As for consumption waste but some hazardous eg 'biomedical', 'sharps', soiled/ disposables, plus food waste	BDG	NBD
Labour process	MSW (pub); subcontracted F pvt company I labour force (pvt); septic tanks and tankers I labour (pvt); I barbers (SE)	Organising factory waste for disposal: Some family, permanent (F/I) labour but mostly casual labour (I)	Pvt but I labour, I SE; collection, disposal (sorting & resale)	Direct recycling via cattle, collected for animal feed (child and I adult labour; dumping for pub/pvt I labour/ISE to collect	Gathering, sorting, selling and dumping 1. Irular SE in town, urban periphery, dump-yard; 2. I migrant rough-sleepers; 3. Gathering (collecting/ bulking) MSW; 4. Collecting and dumping Pvt F Contractor (collecting, bulking, sorting, sale) I Labour; 5. Trade: Re-cycling; Partially I Wholesaler hierarchy; 6. Re-processors; (barter / sale) ISE; 7. I Second-hand dealers	Human waste as for Labour (1); general/food waste as for Consumption waste (4); hazardous medical waste collected for incineration (F. pvt contractors) or segregating and dumping (ISE)	Dumping in street, taken as fodder for domestic livestock production (NB pigs produce meat, bristles, fat and animal therapies) via I domestic servants or I casual labour	I supplement to F labour
Examples in field research	Septic tanker businesses; MSW, IWE	Industrial alcohol Clothing accessories Rice Mills	Indian Railways	Vegetable Wholesale and retail markets	Dumped waste; re-use e.g. 'collectables', motorcycles, recycling: e.g. paper, plastic, polythene, card, glass, metals, cloth, consumer durables, cars and lorries	Housekeepers in government and private hospitals and clinics	Food waste I labour in meals hotels and wedding hall	Glass bottles trade

Source: author's fieldwork 2015, 2016
F: formal/ registered I: informal/ unregistered S: solid L: Liquid BD: biodegradable NBD: non-biodegradable Pub: public pvt: private SE: self-employed MSW: municipal sanitation workers

Fourth, empirical material on social relations is used to evaluate how the three schools of thought about the dynamics of the informal economy which emerged from specific historical contexts and are contested to this day (Banks et al, 2018) might be mobilised to explain the co-existence in time and space of marginalised, legally pre-emptive, and structurally exploitive social relations in the waste economy. [xxxvii]

2.Informalisation and Policy : knowing 'what is to be done'

Prior to reviewing research splicing together waste and policy, two further bodies of work need introducing: first, the development problems identified by research on the IWE; second, the informalisation of policy processes.

Waste, Disorder and Invisibility

The binary concept of disorder pervades evaluations of India's waste. 'Cities are literally drowning in their own solid waste' (de Bercegol et al, 2017), their ecosystems are unable to cope (Wastewise, 2015). Waste is noticed and held responsible for adjectives like 'unwholesome', 'filthy', 'repellent', 'malevolent', 'unruly' [xxxviii], for nouns like 'nightmare', chaos', 'disorganisation', 'impurity', and for morally loaded phrases like a 'threat to public health', 'accumulation by contamination' and 'public bad'.[xxxix] Yet the 'tapestry'[xl] of the IWE is also recognised as an informally organised public service: a peculiar one subject to public blindness, social (elite) invisibility and lack of political recognition.[xli]

The disorder of waste is also evaluated using socio-spatial terms. It encroaches on the cultural purity of the 'inside'. Outside the domestic sphere, 'the bazaar' is the stamping ground of the non-bourgeois citizenry, or non- or incomplete citizens, alternatively the sites of impure mixing of bearers of differentiated social status.[xlii] Whatever its social interpretation, 'the bazaar' is where waste accumulates or is processed.[xliii] Informal urban waste space may be centrally sited and cramped or territorially peripheral. Both kinds of space are found neglected in infrastructural terms and vulnerable to physical destruction and for the displacement of their residents and workers. What is to be done given the consensus that the drivers of the destruction of 'space for waste' and of moral indifference to the life–conditions of 'waste labour' are capitalist urbanisation aided and abetted by the client-state which supplies land for construction and for infrastructure? [xliv]

'Policy is what it does' (Schaffer, 1984) : Informalising Policy

Second, before examining the contribution of IWE scholarship to the political question what is to be done? we need to pull together the ways some strands of policy research conceive of the informalisation of policy. Just as waste reproduces the social order so does does informal political

activity, against which the Indian state is not proof. What kind of informal politics is practised inside the state?

The state acts informally when it contravenes or fails to enforce its own regulations (Roy, 2009). This may happen wherever non-state social forces penetrate the state and make it cede its power. Its scope to regulate society is then constrained, and social authority seeps complicitously into its bureaucratic nooks and crannies. Inadequately reduced to 'corruption' and 'rent-seeking', the range of practices, exchanges and transactions recorded in the research literature on informality in policy-making and implementation invokes distinctive modes of policy practice. [xlv]

Just as informality preceded its labelling, so the de-regulated state long preceded its formal identification as such. And just as waste is subject to many terms and meanings so the conceptualisation of the informalised state has proliferated: as its own 'shadow', as 'parallel' and 'meshed', as 'ambiguous', and a 'cascading structure of power', as 'legally pluralist', as a shifting and dynamic process and a manifestation of 'vernacular governance'.[xlvi] Such a state is an ensemble of 'policies, laws and acts, processes and protocols, institutions, social, political and governmental actors and planning history' (Sundaresan, 2017, p21). Prakash (2017) finds that the state, while an arena for the new public management under which it openly regulates to serve the interests of capital, is also penetrated by allegiances owing their legitimacy to party politics, caste, religion and ethnicity. So he sees the state as informally hybridised and both a giver and a seeker of rents. Yet the very informal practices that make the state's transactions possible also paralyse its capacity to make and implement any development policy which has to cut across such allegiances (Roy 2009). Far from chaotic, for Roy, the informalised state has a class logic in which violations of formal laws by 'elites' are either ignored or legitimised by amnesties. She calls this process 'un-mapping'. This involves the re-notification and reallocation of land use categories for the purposes of privatisation, beautification and the capture of rents. Meanwhile violations of laws in 'slums' threaten the legal sanctity of property and bourgeois

aesthetics, and head for punishment: the destruction of property and the expulsion of 'waste people'.[xlvii]

The rise of waste and the fall of waste policy

In scholarship on urban informality, planning and land use have an exceptional status – in many studies the only policies considered. But policy for waste generates further idiosyncrasies and insights into the informalisation of policy.

First, waste has been awarded a policy field of its own – solid waste management (SWM) (Kumar et al 2009). As a policy field SWM is ranked low, is 'rarely mentioned' and suffers from lack of finance, manpower and equipment.[xlviii] This type of waste policy has been developed and politicised unsystematically and selectively in ways which privilege disposal over re-use and recycling and large scale technologies and corporate forms of business organisation over the generally smaller scale of the IWE. [xlix] In ignoring the IWE, this formal SWM policy both relies on it and seeks to destroy it. Research into incineration ('waste to energy policy' (W2E)) for a paradigmatic example shows formal policy as grounded in a cost-benefit approach to feasibility (CBA) which fails to compute the social costs both of informal livelihoods displaced and of its own pollution (Luthra, 2017).[l] CBA for W2E also both needs and does not cost the IWE required to handle un-incinerated composting and recycling and yet it will subsidise incineration (through 'viability gap funding') so as to destroy the IWE (ibid).

Second, at the same time, the field of policies relevant to waste that are informalised in implementation is extensive. Both the success (causing pollution) and the failure of W2E (wasting scarce public resources) have contributed, along with a co-ordinated body of action-research[li], to an politics of grass-roots mobilisation in the IWE. This is found to have varying degrees of informality. Normative calls justify a new alternative policy agenda for waste which formally recognises the informal public service of the

WE. [lii] The concepts of 'co-production' and 'integration' [liii] require new institutions to shape collective political action moving towards elementary formalisation. These new (sometimes gender-specific) institutions include community organisations, NGOs and unions by means of which contracts for SWM with the local state can be formalised.

Their objectives are reported to have included the improvement not only of i) informal working conditions (medical checks, safety equipment, toilets, access and rights to waste, to routes, and to space for processing and storage, protection against the seizure of their supplies, their incomes, profits and rents) and ii) upgraded appropriate technology (for composting and biogas, re-use and recycling) but also iii) progress towards less incomplete citizenship (ID cards, registration, access to credit, positive discrimination for waste-workers in non-waste sectors of the state bureaucracy) and iv) human development (child-care, housing, their own sanitation infrastructure, social safety nets, education of children of waste workers and adult education, and reskilling when displaced and 'rehabilitated').[liv] This list maps out the scope of a political-economic transformation but the literature suggests that any given instance of mobilisation to date has struggled in vain to gain more than recognition for one or two work-related objectives, when framed in technical terms. Non-work related objectives, in the sphere of social reproduction, rely on a politics of citizenship rights as much as a politics of work. Mobilisations for the former also can and do take place without the latter.[lv] The more a group of informal waste-pickers is socially (caste/gender) homogeneous, the more prospects for organisation to claw work- or non-work rights improve.[lvi] A work-force fractured by social status is hard to organise by itself; it cannot threaten to stop work to press demands. Hence the importance of formal NGOs and CBOs.

But the formalising of informal political space generates tensions in performance. On the one hand the local state's enjoyment of newly organised 'partnerships' may conceal the shedding of management to ill-equipped and inexperienced local collective organisations (eg caste

associations, occupational gangs) and the shifting of logistical costs and risks onto people for whom the institutional preconditions are absent and unfunded (eg no physical links to sanitation infrastructure for 'improved toilet technology'). [lvii] On the other hand, the alliances needed to realise contractual relations with local states are also cross-class arenas for 'voice' and solidarity.[lviii] They are thought to form the building blocks of participatory democratic politics, even if not integrated with a critique of contemporary society - as in the case of Brazil.[lix] Theirs is an immediate politics at some remove from one that evaluates, politicizes and seeks radically to transform capitalist urbanisation and city government in the interests of the labouring poor.[lx]

While focussing on policies to support improvements to the life-worlds of IWE workers, it seems a research gap is emerging between the struggle for formal recognition and the informalisation of policy responding to this struggle: the evolving practices of vernacular governance of waste in all its specificity.[lxi] Waste research at present contributes little material to 'theorise the actual practice of planning' and policy (Sundaresan, 2017).

In the small town we have researched, the presence of much physical disorder and the absence of any sign of rule by aesthetics [lxii] or of normative policy for waste apart from the part-privatisation of the workforce that is common to all public institutions and stalled plans for resiting dumps, means there is room for research which steps inside the state and analyse its formal and informal institutional architecture and governance practices. Local government in small towns is formally responsible for stocks and flows of waste [lxiii] but public ownership is commonly confined to the dump-yard and its inadequate transport fleet and the IWE is de facto out of its control.

A focus on municipal government can situate waste practices in micro-bureaucratic and political relations inside the state which form the constitutive context for waste and are the informal preconditions for any future action (see Harriss-White, 2018a).

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ENDNOTES

[i] Sinha and Adams, 2007; about half of it is black (Kumar, 2013)

[ii] In 2005 the National Commission for Enterprises in the Unorganized Sector in India (NCEUS) defined the informal economy as all unincorporated private enterprises owned by individuals or households engaged in the sale and production of goods and services operated on a proprietary or partnership basis and with less than 10 total workers' (NCEUS, 2005, p3).

[iii] Cave 2017

[iv] Demaria and Schindler 2015, Gidwani and Reddy, 2011, Fernandez 2017. In this review we exclude the complexities of microbial and of gaseous waste – but see White et al 2012 for debates about the importance of the informal economy to GHG emissions and Vergara et al 2015, for a worked-out example from industrial ecology.

[v] Thompson 1979/2017, Guibrunet and Broto 2016

[vi] Whitson 2011

[vii] Chakrabarty 1992; Doron and Raja, 2015; Rodrigues, 2009
[viii] Marx 1971
[ix] While Mary Douglas (1966/2001) famously argued that waste was 'matter out of place'.
[x]Evans 2011, Gill, 2012, O'Brien 1999 a and b, Wath et al 2011,
[xi] See for example Evans, 2011, Gidwani 2013, Gill 2012, Thompson, 2017, Wath et al 2011
[xii] As desirable for example in material stock and flow analysis of the 'informal city' (Guibrunet and Broto 2016)
[xiii] One of five sectors and 'types' of informal worker studied and campaigned for worldwide by Harvard's WIEGO and Columbia's Wastewise
[xiv] See for examples Cave 2014, De Bercegol 2017, Delgado-Ramos and Guibrunet 2017, Dias 2017, Dias and Samson 2016, Fernandez 2017, Gill 2010, Gidwani 2015; Guibrunet and Broto 2016, Inverardi-Ferri, 2017, Khazvini 2015, McFarlane 2008, Suryaprakash 2014
[xv] See the engineering literature in CEE, 2014, political ecology literature in Guibrunet and Broto 2016, see also Demaria 2010, Doron and Reddy 2015, Benjamin 2008
[xvi] Cave 2014, Delgado-Ramos and Guibrunet, 2017, Khazvini 2015.
[xvii] Chikarmane and Narayan list the range of activities in the Hamal Mathadi Act of 1969 as 'catching, collecting, sorting, loading, unloading, weighing, measuring, stacking, carrying, stitching, cleaning, filling or any such other work including work preparatory or incidental to such operations' (2000 p 3641).
[xviii] Impure because though non rivalrous most waste is excludable (Cave 2017)
[xix] Reddy 2013 is quoting from Chaturvedi and Gidwani, 2010
[xx] For a low general estimate of the expansion see CSE 2016; for a high local estimate see Harriss-White 2017b
[xxi] Cave 2014, Chikarmane and Narayan 2000, Dias 2016, Guibrunet and Broto 2016
[xxii] Suryaprakash 2014, Inverardi-Ferri 2017, van Dijk 2017
[xxiii] Gill 2006, 2007, 2010; Suryaprakash 2014, McFarlane 2008, 2012; WIEGO 2017
[xxiv] In legislation spanning the period 1955-2013 (see Wilson and Singh 2012 for the legal struggle)
[xxv] Data is poor, but see Khazvini 2015.
[xxvi] HRW 2014. Open defecation is also regarded by many practitioners as healthy and 'natural' (Coffey et al 2017)
[xxvii] Some 97% of menstruating women in a slum study used cloth and only 1% washed and re-used such cloth (Garg et al 2001). For animals see Harriss-White and Rodrigo 2016.
[xxviii] https://www.asc.ox.ac.uk/event/india-becoming-post-caste-society
[xxix] Variously Chakrabarty 1992; much case material in HRW 2014, McFarlane 2008 Dias and Samson 2016
[xxx] Chen 2007 was first to theorise informal labour relations within formal entities.
[xxxi] Chikarmane et al 2000, Fernandez 2015; McFarlane 2008,WIEGO 2017
[xxxii] See especially Demaria and Schindler 2015
[xxxiii] Harriss-White 2017 a and b; Harriss-White 2018 a; Harriss-White and Rodrigo 2016,
[xxxiv] Denis et al., 2012, Harriss-White 2015.
[xxxv] Tara van Dijk, Pers.Comm. February 2018
[xxxvi] So important activity like the social relations of disposal of construction/demolition waste, e-waste, re-processing industry and waste from waste await further exploratory research in small towns.
[xxxvii] Harriss-White 2018b
[xxxviii] Chakrabarty 1992, Gill 2010, Doron 2016
[xxxix] Chakrabarty 1992, Cave 2014, 2017, Demaria, 2010; Demaria and Schindler, 2015; Rodrigues 2009
[xl] Khazvini 2015, Dias 2016, Luthra 2017
[xli] Chakrabarty 1992, Doron and Jeffrey 2018, McFarlane 2012

[xlii] Gidwani 2015, Rodrigues 2009, Doron and Raja, 2015, Doron and Jeffrey 2018, s ee alsoWhitson 2011 for Buenas Aires
[xliii] Chakrabarty 1992
[xliv] McFarlane, 2012, van Dijk, 2017
[xlv] Rajagopal, 2015, Roy 2009, van Dijk, 2017
[xlvi] Roy ,2009, 2012; de Bercegol et al 2017, Prakash 2017; Sundaresan 2017, Van Dijk and Bhide 2016
[xlvii] Chaturvedi and Gidwani, 2010, Doron 2016, Gill 2010, McFarlane 2008, Reddy 2013, Suryaprakash 2014. The process of political negotiation over (valuable) space for processing (temporarily or permanently valueless) waste by displaced waste-workers has been called 're-placement' by Whitson 2011, recalling Douglas ,1966.
[xlviii] Cave 2014, 2017; WIEGO 2017, Balarman 2015.
[xlix] Cave 2017, Demaria and Schindler 2015, Dias and Samson 2016, Kumar et al 2009, Srinivasan 2006
[l] See Reddy 2013 for a similar dehumanising and blinkered logic at work for e-waste technology.
[li] See WIEGO and Wastewise websites among others; and Srinivasan 2006.
[lii] Demaria 2010, Suryaprakash 2014, WIEGO 2017
[liii] De Bercegol et al 2017, Demaria and Schindler 2015, Samson 2017, Srinivasan 2006
[liv] Chimarmane and Narayan 2000, Dias and Samson 2016, HRW 2014, Wilson and Singh 2012, Fernandez 2015
[lv] Harriss-White and Rodrigo 2016
[lvi] Chikarmane and Narayan 2000
[lvii] McFarlane 2008, Doron 2016, Srinivasan 2006
[lviii] Demaria and Schindler (2015) show how the reasons for such alliances may be starkly different – bringing together problems of air pollution for elite residents neighbouring an incinerator and displaced livelihoods for waste workers.
[lix] HRW 2014, Dias 2017
[lx] Derickson K. 2916
[lxi] De Bercegol et al 2017, Schindler et al 2012, Demaria and Schindler 2015, Schindler 2017
[lxii] Roy 2009, Doron 2016
[lxiii] Demaria and Schindler 2015

SMALL TOWN WASTE ECONOMY – A PHOTO GALLERY (2015-16_)

PRODUCTION OF WASTE IN PRODUCTION

WASTE IN DISTRIBUTION

Waste in Distribution -contd

CONSUMPTION WASTE

Consumption waste contd

WHOLESALE HIERARCHY






PUBLIC AND PRIVATE





THE DUMPYARD

DUMPYARD AFTER FLOOD -2016

HUMAN WASTE –WASTE IN THE PRODUCTION OF LABOUR





PRODUCTION OF WASTE IN THE REPRODUCTION OF SOCIETY – 1.ALCOHOL

PRODUCTION OF WASTE IN SOCIALLY REPRODUCTIVE ACTIVITY – 2. MEDICAL

Photos courtesy of Dr Sarah Hodges, Warwick University









CLASS RELATIONS IN A SMALL-TOWN WASTE ECONOMY



CASTE RELATIONS AND DISCRIMINATION IN A SMALL-TOWN WASTE ECONOMY






IRULAR COLLECTORS






ANIMAL AGENCY




NEW MARKETS FOR RE-USE

WASTE ESSENTIAL INPUTS


Shots
Enriched with
Electrolytes
&
Vitamin