Policy BRIEFING

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Managing the Emerging Waste Crisis in Developing Countries' Large Cities

Rising prosperity around the globe is both welcome and, in many countries, long overdue. However, it brings with it a number of undesirable consequences, such as an increased demand for raw materials, which puts pressure on limited natural resources, and the generation of waste, due to dominant linear economic models of 'make-use-throw'. The circular economy model proposes a move towards the complete elimination of waste by bringing resources embedded in products back into the production process through repair, re-use and recycling. This Policy Briefing identifies some of the key challenges and opportunities for transitioning waste management into resource management, which engages both the formal and informal sector and provides livelihoods for the urban poor.

The waste management challenge for global cities

Rising quantities of waste are becoming a major global challenge, manifested most visibly in large cities and felt most acutely in developing countries. The World Bank estimates that waste generation will double in the next 20 years in lower and lower-middle income countries, as a result of rising population and disposable income, while the costs of solid waste management are also expected to rise steeply. Urban settlements especially are major centres of consumption and, as a result, major generators of waste. However, high density of population, unplanned urbanisation and weak physical infrastructure are resulting in open dumping or burning of waste.

In developing countries, waste management provides a livelihood for 1–2 per cent of the population, mostly the urban poor. A widespread informal sector provides multiple job opportunities through labour-intensive processes of collection, manual segregation, and dismantling of waste. In India, for instance, most of the waste management sector is informal with up to 90 per cent of recycling being organised in the informal sector. In spite of its informality, this sector is well organised, and the services provided are efficient as well as convenient. However, rapid urbanisation is putting this model under pressure, whilst the sector is now, in some way, contributing to the issue by dumping or burning fractions of the waste stream whose value cannot be recovered without investment.

Additionally, changing consumption patterns mean changing composition of waste streams with newer products such as electronic goods. The quality and value of the resources embedded in such waste reinforces the need for resource recovery. With the rising commodity prices and scarcity of certain materials, recycling is turning into a much more profitable enterprise, with recyclables such as paper, plastic, glass and metals found in abundance in household waste.

For city managers as well as the local population, this burgeoning waste is not only an environment and health hazard, for example open dumping can contaminate land and water or increase the risk of vector-borne diseases, but also presents a visible hygiene and cleanliness challenge. However, local governments have limited know-how and access to finance and there are governance gaps in the management and functioning of the local bodies.

Through use of technology, the private sector can be a cost-effective option. Already, large, formal waste management companies have expanded rapidly in the big cities of developing countries. Indeed, city governments often prefer to contract big companies to collect and process waste, failing to acknowledge the role of the informal sector, and this is creating conflict which undermines the potential of both in supporting a transition from waste management to resource management.

Transitioning from waste management to resource management

The distinction between waste management and resource management is best understood using the fundamental economic notion of value. The value of waste is enhanced when it is properly segregated and all the embedded resources are extracted. Similarly to mining, where an ore's value only increases when the metal in it can be extracted, a city might generate large quantities of waste, but the value of resources recovered would depend on a series of processes beginning with segregation and ending with recycling/recovery of valuable materials. This is sometimes referred to as 'urban mining', and presents a major opportunity for cities faced with critical waste management challenges. Experiences from urban agglomerations around the world suggest that certain cities are closer to the waste management part of the continuum while others are closer to the resource management part of the continuum.

Four potential future scenarios for waste/ resource management

Using tools from Foresight methodology, the following table outlines potential scenarios for the future of waste management in large cities of emerging economies. They were developed with a range of experts on waste/ resource management looking specifically at the context of India, but are relevant for most developing countries struggling to deal with the rising quantities of waste. They describe radically different futures, influenced by factors such as economic growth, prices in commodity markets, consumption patterns, waste treatment technologies and policy, and while these methods do not provide exact predictions of the future, they are useful for understanding how each potential scenario might be influenced by the multiple actors and multiple uncertainties.

The exercise highlighted how the only way the informal sector can flourish and accelerate the transition from waste management to resource management is through the active support of other actors, especially local government. Such support would not entail subsidisation, and could even result in additional revenue generation through the extension of simplified regimes of taxation. Additionally, it demonstrated how incorporating the informal sector has other beneficial impacts which support the transitions from a waste management to resource management perspective.

Scenario	Attitudes to waste	Waste management process	Consequences	Key issues
State of Nature Business as usual in many urban agglomerations around the developing world	Typical linear models of make-use-throw Waste is a problem that needs to be 'managed' Informal sector 'part of the problem' (despite reducing burden on local government) Limited engagement by manufacturers whose products (or packaging) generates waste	Where there is a market, some household waste is collected, segregated and recycled by informal sector; outside legal framework Unsorted waste collected by private companies contracted by city governments (financed by taxes on property and subsidised by central government) Waste is then either deposited at secondary collection points or sent directly to transfer stations; eventually transported to landfills – essentially open dumping grounds with limited energy recovery Informal sector further segregates waste at secondary waste dumps or landfills, 'cherry-picking' the valuable material	Lack of scientific disposal mechanisms and capacity constraints leads to widespread open dumping of waste resulting in 'mini' landfills around the city. Waste is openly burnt due to the odour from dumps Policy instruments such as extended producer responsibility neither understood nor applied	Limited incentives for private sector to develop innovative technologies Grass-roots innovation driven by informal sector; however, little attention to environment health and safety norms Conflict between formal and informal sector – resulting in lobby groups and alliances
The Revolutionary Margin	Waste management is a service provided by informal sector, focus is on collective rights and safety Informal sector a local government 'ally' (works within legal ambit) Limited focus on resource recovery	Local government works in partnership with informal sector, predicated on its ability to get organised as a collective body Informal sector provides door-to-door collection, segregation of household waste (likely to be based on occupational health and safety considerations, e.g. 'hazardous' and 'non-hazardous' with limited focus on resource recovery) Formal waste management companies manage non-recyclable waste as well as recovering energy at the landfill	Organised informal sector accesses majority of recyclable waste so can bargain for better prices with recyclers in the formal sector Economies of scale and better linkages mean the collective can invest in material sorting and recovery facilities	Initially low levels of material resources and energy embedded in waste because of improved ability of informal sector to remove recyclable material Incinerators (for remaining waste) may need further subsidies However, fraction of waste not being recycled could increase where informal sector does not have market or technology to process new materials (from new, complex products) Potential for reappearing conflict as formal technology-driven companies exploit gap in market

Scenario	Attitudes to waste	Waste management process	Consequences	Key issues
Techno-Nirvana	Focus is on recovering the maximum value from the waste through innovative and capital-intensive technology	Local government collaborates with formal private sector to recover value out of waste and introduces technology-based interventions for resource management Contractual agreements (through public–private partnerships) are for whole waste value chain Households segregate waste at source into multiple categories. Door-to-door collection organised by formal private sector through motorised pick-up vehicles Large centralised material recovery facilities segregate recyclables and compost organic fractions of waste. Non-recyclable and inorganic fractions sent for energy recovery in large capital-intensive incinerators	Informal sector provides services to households trading recyclables but is restricted and actively discouraged by local government. This waste goes either to material recovery or to recycling facilities where it is crushed for recovery of material or burnt in incinerators Waste management companies lobby against informal sector role since monopolistic access to all waste contractually agreed Manufacturers whose products can be turned to useful waste engage with local government and waste management companies to develop innovative solutions Regulations governing partnership between local government and private sector create entry barrier for small informal sector companies – leading it to become disenfranchised	Informal re-use and repair industry suffers because extended producer responsibility is interpreted to extend producer property rights to entire product life cycle Waste management infrastructure highly capital-intensive, large-scale, mechanised, as well as carbon- and energy-intensive Cost passed on by local government to waste generators – households, commercial establishments, and non-commercial organisations Additional increased costs for pollution control and monitoring the infrastructure Financial intermediaries support innovative entrepreneurs or large waste management companies to set up waste management infrastructure Potential conflict between environmental groups and local government, inexperienced in the consequences of large infrastructure
Green Transformations	Focus on inclusive resource management Local government values resource-saving potential of skills, networks and decentralised infrastructure as well as potential for job creation which results from this partnership with informal sector collective	Waste segregated at source by generators (households, commerce, etc.) with door-to-door collection managed by an informal sector collective Collections monitored and material is transferred to decentralised material sorting facilities, also managed by the collective in partnership with non-governmental organisations (NGOs) and technology start-ups Local government pays waste pickers, operates state-of-the-art landfills, and actively encourages repair and refurbishment markets through incentives such as providing space for weekly markets selling second-hand and repaired goods Financial and regulatory instruments make landfilling of recyclables and energy-rich materials prohibitively expensive for the waste disposer Repair and re-use industry actively promoted and works in close partnership with product manufacturers	Manufacturers work with informal collectives setting up take-back programmes for end-of-life products, making them a crucial link in their value chains Local government can enforce environmentally sound and occupational health and safety compliant processes. Process is facilitated by simplified regimes of taxation to informal sector enterprises who are members of the collective	Incinerators not considered viable for developing country context (due to absence of adequate monitoring capacities and infrastructure for pollution control) Minimal conflict between formal and informal sectors since the former benefits from the latter's participation in the value chain However, such participation needs active intervention from local government and other policy enablers to ensure materials do not leak back into unregulated markets

Policy recommendations

Approaches to policy design

The following approaches will help open up the policy design process, allowing policymakers and influencers to benefit from dialogues that could shape policy design and implementation in complex and uncertain ways, best suited to unpredictable futures.

- **Use Foresight methods as a tool for policy development, especially in policy spaces which are created and dominated by special interest groups.** Focusing on the distant future, rather than on immediate realities, and developing shared visions through scenario development helps to open up dialogue. Applying a participatory process and ensuring multi-stakeholder representation will help explicitly bring out potential for alignment and conflicts of objectives underpinning most policy design processes.
- **Use of multiple feedback loops throughout the policymaking process rather than follow linear stages of formulation, implementation and monitoring**, so as to remain adaptive to emerging realities. Feedback loops (for key stakeholders) and the resulting adaptive nature of policymaking becomes even more critical in policy arenas like waste management with multiple actors who have radically different and conflicting objectives that influence, and are affected by, the policy.
- **Use of a joined-up, multidisciplinary approach** which brings together insights from fields of environment science and engineering, social protection, business studies and political economy is critical for the development of any meaningful intervention in waste management, given the multifaceted challenges it poses.
- **Collaborate across all levels of government, both national such as Ministries, and local.** Waste management has traditionally been the policy domain of Ministries of Environment and Urban Development, with local governments implementing their policies. However, as countries realise the multiple benefits of resource management – opportunities for businesses, opportunities for innovations, recovery of energy and other material resources, prospects of job creation – a joined-up approach necessitates collaboration with other national Ministries such as Industry, Finance, and Science and Technology. This breaking up of silos is critical for the transformation from a waste management to a resource management perspective.

Informal sector engagement by local government essential for transition from waste management to resource management

- Mainstreaming the informal sector is both economically efficient and financially beneficial for local governments as it reduces the costs of waste management as well as the need for large-scale investments in infrastructure. An accelerated transition is contingent on ongoing and active engagement by the local government to avoid any potential for conflict between the informal and formal private sector.
- Local governments need to forge alliances between those with divergent objectives and priorities, such as the informal sector, the formal private sector, and civil society/NGO groups. A broad understanding of local politics, policies, actors and interests is essential before any policies are proposed and reforms attempted by the local government. Contrary to the recommendations of most government policy documents (especially in India), raising awareness and finding private sector suppliers of appropriate technologies should not be the only focus of local government responsible for waste management.

Further reading

Chaturvedi, A.; Vijayalakshmi, K. and Nijhawan, S. (2015, forthcoming) *Scenarios of Waste and Resource Management: for Cities in India and Elsewhere*, IDS Evidence Report, Brighton: IDS

Chaturvedi, A.R.; Arora, R. and Singh Saluja, M. (2015, forthcoming) 'Private Sector and Waste Management in Delhi: A Political Economy Perspective', *IDS Bulletin* 46.3

Credits

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