

Institution: University of Sussex		
Unit of Assessment: 17 – Business and Management Studies		
Title of case study: Driving sustainable urban waste policy and practice in India		
Period when the underpinning research was undertaken: 1 Jan 2000 – Jul 2017		
Details of staff conducting the underpinning research from the submitting unit:		
Name(s):	Role(s) (e.g. job title):	Period(s) employed by submitting HEI:
Fiona Marshall	Professor of Environment and Development, Science Policy Research Unit (SPRU)	2004 – present
Jonathan Dolley	Research Fellow	2015 – present
Period when the claimed impact occurred: 2014 – 2020		
Is this case study continued from a case study submitted in 2014? N		
1. Summary of the impact Difficulties with India's urban waste management systems have caused significant environmental, health, and social justice problems for people living in its cities. Professor Fiona Marshall's research has directly altered urban waste management policy and practice – by devising and promoting sustainable, decentralised approaches that bring benefits for the environment, economy and society, in addition to supporting the livelihoods of some of India's millions of wastepickers. The research team worked with stakeholders to influence a key piece of Indian national waste management legislation, and also collaborated with NGOs to facilitate unprecedented partnerships across the formal and informal sectors, leading to improvements and innovations in practice as well as policy.		
2. Underpinning research 2.1 The problem The research set out to find solutions to India's growing urban waste management crisis. An estimated 90% of waste in India is dumped in public spaces, causing a host of environmental and health problems. Waste-to-energy (WTE) technologies, which involve incineration, have become India's preferred mainstream solution in recent years. WTE displaces rather than removes environmental hazards and puts additional pressure on marginalised communities and livelihoods. It fails to recognise the vital role played by the estimated 1.5 million informal wastepickers working in Indian cities. By collecting waste and selling recyclable materials, wastepickers reduce Delhi's daily waste disposal load by at least 1500 metric tonnes (MT) (from a total of 8,360 MT) and prevent around 932,000 tons of greenhouse gas emissions every year. Delhi's waste pickers also added a social value of about 3.5 billion rupees (around £38 million) to the city's economy in 2002-3. The focus on WTE has attracted widespread opposition due to increased air pollution, a lack of regulatory control over emissions, and the fact that recyclable waste is sought by WTE plants, leading to lower recycling rates and reducing wastepickers' incomes. It has been estimated that Delhi's three WTE plants would cause 300,000 wastepickers to lose their livelihoods. 2.2 The research process Professor Fiona Marshall has been leading a programme of transdisciplinary research concerning urban and peri-urban sustainability in Asia for the past two decades. The programme has engaged diverse stakeholders in participatory and mixed methods social science research to analyse how sustainability is defined and sought in diverse, risk-prone and dynamic urban contexts. It has examined the social and political infrastructures that create and reinforce particular mainstream development trajectories, and the complex governance arrangements that influence outcomes for the environment and for poor and marginalized communities.		

Marshall's research has assessed the potential for alternative urban development trajectories that can enhance environmental integrity and social justice [R5], as well as studying the role of transdisciplinary action research in realising this potential [R4]. As part of the wider programme of work, Marshall led a project on urban waste management in India between 2011 and 2015 [R1]. The project involved working with local partners including Jawaharlal Nehru University in Delhi, the NGO Toxics Link and two wastepickers' associations, and was funded as part of the £9 million ESRC investment in the Social, Technological and Environmental Pathways to Sustainability (STEPS) Centre, which is co-led by the University of Sussex and the Institute for Development Studies [G2]. The research sought to understand:

- What processes are involved in the prioritisation of particular policy options and technological interventions for solid waste management?
- Who gains and who loses from current solid waste management interventions?
- What alternative environmental management scenarios, institutional and regulatory arrangements – as well as forms of citizen action – could help to provide healthy, secure livelihoods for urban and peri-urban residents?

R1 describes the transdisciplinary action research process, which involved focus groups, workshops and semi-structured interviews with residents, NGOs and government officials, as well as shadowing wastepickers through their daily routine. These methods ensured that the core beneficiaries of the research were engaged from the outset and enabled the team to explore a diverse range of narratives and understand the evolution and the implications of the current centralised waste management approach. Case studies in the Indian cities of Ahmedabad and Pune enabled the researchers to compare the WTE approach in Delhi with grassroots innovations in other areas.

Other projects led by Marshall that support sustainable urban development in the Global South include **R3**, funded by the Ecosystem Services and Poverty Alleviation Programme (a £40.5 million programme supported by RCUK and the Department for International Development) [G1], and an ongoing project funded by the British Academy under the Urban Infrastructures of Well-Being initiative [G3].

2.3 Research findings and insights

Through interactions with the various stakeholders in the Delhi project [R1], it became clear that the current WTE approach simply displaces health hazards across time, space and social groups, and exacerbates social justice concerns. Key insights included:

- The official understanding of urban waste management fails to recognise the complex flows of waste and related risks. As a result, environment, health and residents' livelihoods are being threatened, and innovative solutions are overlooked.
- Despite the recent dominance of the private sector in urban waste management, the informal sector continues to be deeply involved. This reveals a need to include wastepickers in the system, including giving them space to segregate waste and protection from health hazards.
- Some waste needs large-scale technical interventions, but degradable household waste can be processed locally with solutions such as composting and bio-methanation.

The team propose an alternative, sustainable approach to urban waste management and regulation that includes a central role for the informal sector, increased opportunities to reuse and recycle, and more localised initiatives to handle degradable waste. They distilled their insights into eight principles [R2], summarised as follows:

1. Waste is not just an environmental policy and regulation issue.
2. Waste flows are more complex than the official system recognises.
3. Environmental health and social justice challenges are distributed throughout the waste chain.
4. Privatisation creates new conflicts with the informal sector, which could be mitigated by

hybrid arrangements and partnerships.

5. Decentralisation solutions can be used alongside centralised approaches.
6. Incentive structures could support more sustainable options.
7. Possibilities for constructive engagements in policymaking, planning and implementation exist.
8. Environmental and social justice movements offer key insights into alternative waste management pathways but must be supported to collaborate constructively.

3. References to the research

- R1** Randhawa, P., Marshall, F., Kushwaha, P. K., and Desai, P. (2020) 'Pathways for sustainable urban waste management and reduced environmental health risks in India: winners, losers and alternatives to Waste to Energy in Delhi', *Frontiers in Sustainable Cities*, 2(14), pp. 1-15. <https://doi.org/10.3389/frsc.2020.00014>
- R2** Agarwal, R., Marshall, F., Pandey, P., Randhawa, P. (2015) Rethinking urban waste management in India, Falmer: STEPS Centre. Available at: <https://steps-centre.org/wp-content/uploads/Policy-Brief-April-2015.pdf>
- R3** Marshall, F., Dolley, J., Bisht, R., Priya, R., Waldman, L., Amerasinghe, P., and Randhawa, P. (2018) 'Ecosystem Services and Poverty Alleviation in Urbanising Context' in Schreckenber, K, Mace, G and Poudyal, M (eds) *Ecosystem Services and Poverty Alleviation: Trade-Offs and Governance*. London: Routledge, pp. 111-125. <https://doi.org/10.4324/9780429507090> Available on request.
- R4** Marshall, F., Dolley, J., & Priya, R. (2018) 'Transdisciplinary Research as Transformative Space Making for Sustainability: Enhancing pro-poor transformative agency in peri-urban India and China', *Ecology & Society*, 23(3):8. <https://doi.org/10.5751/ES-10249-230308>
- R5** Marshall, F. and Dolley J. (2018) 'Transformative Innovation in Peri-Urban Asia. *Research Policy*', 48(4), pp. 983-992. <https://doi.org/10.1016/j.respol.2018.10.007>

Related grants:

- G1** '[Risks and Responses to Urban Futures: Integrating peri-urban/urban synergies into urban development planning for enhanced ecosystem service benefits](#)' (1 Feb 2014- 2018) Funder: ESPA (NERC-ESRC-DFID, [NE/L001292/1](#)). PI: Marshall. Total award £475,000 (£267,813 to Sussex)
- G2** '[Pathways of Environmental Health in Transitional Spaces: Moving between Formality and Informality](#)' (2011-16). PI: Marshall. ~£300,000. Funded by ESRC via the £9m [STEPS](#) (Social, Technological and Environmental Pathways to Sustainability) Centre, [2006-11](#), [2011-17](#), [2018-21](#).
- G3** 'Inclusive Green Infrastructures for Urban Well-Being' (2019-2021). [The British Academy](#) ([UWB190102](#)). PI Marshall. £244,847 to Sussex.

4. Details of the impact

Professor Marshall's research has directly improved the way that waste is managed in India – both by shaping national policy and by inspiring the significant informal sector to develop successful new initiatives in waste management practice.

4.1 Shaping national policy

Through sustained engagement and collaboration with organisations including India's Ministry of Environment, Forests and Climate Change (MoEFCC), Professor Marshall and the research team used their findings to inform and shape new national waste management legislation – the Municipal Solid Waste (MSW) Rules [S1]. This legislation, formulated by the MoEFCC, is critical in determining how waste is collected, segregated, stored, processed and disposed of in Indian cities.

When the draft legislation was published for public consultation in October 2013, the research team, through its NGO collaborator Toxics Link, submitted a set of formal objections. The submission referred to the research findings and highlighted how the planned legislation overlooked opportunities for more sustainable waste management strategies. In January 2014, following the submission of objections, the team organised a policy stakeholder forum to discuss the issues. Attendees included senior officials from MoEFCC, the Ministry of Urban Development (now Ministry of Housing and Urban Affairs (MoHUA)), and the Central Pollution Control board (CPCB).

As a result of the objections and the forum discussions, [text removed for publication] of Toxics Link was invited to join a four-person government committee, coordinated by the MoEFCC to redraft the Rules [S2]. [text removed for publication] of the committee, explains the extent of this influence: “I had a privilege to have extensive interaction and critical inputs from expert committee member [text removed for publication] (Toxics Link, New Delhi) in drafting the Rules” [S3]. [text removed for publication] describes how the research from Sussex directly fed into the amended MSW Rules:

“My contribution in the Expert Committee largely drew from the earlier work on solid waste management by Toxics Link and from a collaborative research project on urban waste management with Professor Fiona Marshall from the University of Sussex... Most of these points were incorporated in the final version of the Rules.” [S4]

In May 2015, the project team presented a policy brief [R2] to government officials and representatives from wastepickers’ associations, NGOs, industry and resident welfare associations. The brief provided a timely reference for the redrafting of the MSW Rules. The final MSW Rules [S1], adopted by the Government of India in 2016, represent a significant change in the overarching framework within which waste management policies and plans must be developed across Indian cities. They draw extensively on the research team’s insights – proposing a stronger role for the informal sector, increased recycling and an end to the practice of simply moving hazardous waste from wealthy to poorer areas – and reflect the eight principles outlined above. For example, they:

- Move beyond an ‘environmental policy only’ perspective on urban waste (in line with principle 1) to include many new stakeholders [S1, clause 5]
- Recognise the crucial role of informal wastepickers (principle 4) [S1, clause 11c and 15c]
- Include greater recognition of the benefits of decentralised technologies such as bio-methanation and composting for organic waste (principle 5) [S1, clause 4(7) and clause 8]
- Explicitly require communities to be involved in waste management and promote decentralised processing (principle 5) [S1, clause 11(h), clause 15(m) and clause 15(t)]
- Support the agricultural use of fertilizers produced from organic wastes (principle 6) [S1, clause 4(7) and clause 8].

The new MSW Rules have led directly to changes in the way waste is dealt with. For example, the Municipal Corporation of Delhi (MCD) has planned 10 decentralised waste management plants across the city. The plants use a newly developed technology to treat urban organic waste such as household and food waste. The process generates high-quality manure as well as producing a biogas, which can be used to make electricity. The first of the ten plants, which began operating in February 2019, is currently treating 5 tonnes of organic waste – and generating 800 units of electricity and around 800kg of organic manure – per day [S5].

4.2 Inspiring innovative practices

In addition to the formal influence on policy, the research team worked with NGOs and wastepickers to inspire new approaches and practices in day-to-day waste collection and processing. These local initiatives are an example of the new MSW Rules being put into action.

The All India Kabadi Mazdoor Mahasangh (AIKMM) – a national waste pickers’ association with more than 16,000 members in the Delhi region – has been working closely with the research

team since 2013. This has led to successful new waste management initiatives and partnerships across sectors, as [text removed for publication] from AIKMM explains:

“The research highlighted the need for decentralised technologies... (but) while we were familiar with them, we had never put them into practice. The many dialogues with the project team helped us move in this direction. Now we are involved in implementing successful initiatives on decentralised composting with informal waste workers, municipal bodies and resident welfare associations. We have seven such projects in Bihar, one in Delhi and one in Gurgaon and plan to expand.” [S6]

The research also provided the stimulus for Delhi’s Lok Adhikar (a union for informal wastepickers) to sign a formal contract with a private company for the segregation of waste in Rohini Zone (an area of Delhi with a population of around 860,000). This move is a practical example of principle 4, demonstrating how informal and formal private sectors can form new synergies which support informal livelihoods. Lok Adhikar was convinced to take this step by the project’s research into alternative practices in Pune and Ahmedabad. Lok Adhikar has subsequently been offered a contract for the Civil Lines Zone (population 360,000). These contracts not only provide security of livelihood for informal waste pickers, but also reduce pollution. [text removed for publication] of Lok Adhikar, states:

“As a result of our interactions and the research findings of the project, we got many new insights on our work. These discussions helped us to understand why it is important for us to actively engage with the formal system of waste management... With this view we signed a formal contract with a waste management company. We are also more mindful of the fact that segregation and recycling is not only a beneficial activity for these [informal waste] workers but is also an important environmental intervention for the entire city. We also got a renewed and comprehensive understanding of the MSW Rules 2016. We no longer view it from only a critical perspective, but see it as a site of opportunity... We have conducted workshops for our workers... [they] are now part of the advocacy efforts for the implementation of those provisions that directly benefit them” [S7]

5. Sources to corroborate the impact

S1 Municipal Solid Waste (Management and Handling) (MSW) Rules 2016

S2 Document from Government of India setting up the committee to redraft the MSW Rules, May 2014

S3 Testimonial from [text removed for publication], member of the committee

S4 Testimonial from [text removed for publication], Toxics Link

S5 ‘9 more decentralised waste management plants in Delhi by Yasasu’, Business Standard (April 2019) https://www.business-standard.com/article/news-ani/9-more-decentralised-waste-management-plants-in-delhi-by-yasasu-119043001176_1.html

S6 Testimonial from [text removed for publication] from AIKMM, an Indian national waste pickers’ association

S7 Testimonial from [text removed for publication] of Lok Adhikar (a local NGO working with informal waste pickers)

All supplied as PDF.