

# INDIA

## AIR POLLUTION MONITORING IN INDIA NEEDS TO BUCK UP, SCALE UP AND INTERACT WITH COMMUNITIES TO MAKE A DIFFERENCE



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### Introduction

Air pollution is an acute problem in India, but one that most Indians are unaware of. Data for monitoring air pollution is inadequate, with few links made to the health impacts on different communities according to their exposure levels. The entire effort of mitigation seems to be concentrated on exiting the world's lists of most-polluted countries, where India is always at the top.

Rohit Negi argues that the issue of poor air quality is often set up as a trade-off between development and the environment because the most potent makers of toxic air are also the engines of development. Opting for development creates “hazardous futures” by “expanding economies in deeply unequal social formations.”<sup>1</sup> Sustainable development<sup>2</sup> might be the need of the hour, but it might never come to fruition with unequal social formations as its basis. Both those who live and work in industrial hubs of a modern city and those in the global South of the developed world suffer the most immediate consequences of this development. As Negi aptly puts it, “It has become clear to residents of Asian and African cities that modernity is not a promised land but a dystopia filled with poisonous air.”

### Context

India's air pollution monitoring system is a complex maze. While there is a lot of data, it is often confusing and inaccurate, and only applies to more prominent areas and cities in the country. It is woefully inadequate for tier one and two towns and remote villages where the media glare is less pronounced. The government has launched programmes to address the issue without adequate public awareness efforts to make them successful. Initiatives such as

the National Air Monitoring Programme (NAMP) or National Clean Air Programme (NCAP) promise to reduce air pollution by 20% to 30%, but the motivation behind these promises is unclear. Prakash Javadekar, the current environment minister, recently went as far as to say that there is no link between air pollution and poor health in the country.

The Air Quality Index (AQI) is the most common measurement index for air pollution and is an indicator and a tool to assess pollution levels from a range of pollutants and their corresponding health impacts. While AQI indices are also used in India, a scarcity of monitoring stations to capture AQI for localised regions and deficiencies in real-time monitoring of pollutants render the index inadequate for effective policy making.

The World Health Organization (WHO) reported in 2019 that 11 of the 12 cities in the world with the most pollution from PM<sub>2.5</sub> – particles smaller than 2.5 microns in diameter that can cause dangerous heart and breathing problems – were in India. India dismissed the study, as well as the one from a Yale University research team<sup>3</sup> which put India on the list of the top polluters of the world, as biased.<sup>4</sup> Page two of a 2019 report by the NCAP<sup>5</sup> rebuffs international concerns about the health conditions in India due to air pollution. It states, “The reported perplexing statistics in various international reports, correlating air pollution with health impacts without the use of indigenous dose response functions, further complicates the issue by possibly creating an ambiguous public perception.”<sup>6</sup>

Negi has explained how showing a preference for indigenous air quality numbers might derail the monitoring process as a whole, because some air quality monitors are expensive even for central

1 Negi, R. (2020). Urban Air. *Comparative Studies of South Asia, Africa and the Middle East*, 40(1), 17-23. <https://doi.org/10.1215/1089201X-8185994>

2 <https://www.iisd.org/topic/sustainable-development>

3 Lakshmi, R. (2014, 17 October). India launches its own Air Quality Index. Can its numbers be trusted? *The Washington Post*. <https://www.washingtonpost.com/news/worldviews/wp/2014/10/17/india-launches-its-own-air-quality-index-can-its-numbers-be-trusted/>

4 Ibid.

5 Ministry of Environment, Forest and Climate Change. (2019). *National Clean Air Programme*. [http://moef.gov.in/wp-content/uploads/2019/05/NCAP\\_Report.pdf](http://moef.gov.in/wp-content/uploads/2019/05/NCAP_Report.pdf)

6 This quote shows the use of confusing phrases to hide real issues. For example, there is no explanation of what “indigenous dose response functions” means. Yet it is used in an official public report to quell the rising anger over the government's inaction against pollution, which is now being noticed internationally.

governments, and need international intervention for accurate observations.<sup>7</sup> Additionally, national<sup>8</sup> and international<sup>9</sup> media have reported how India's air quality numbers could not be trusted because of the tripartite reasons of faulty equipment, data fudging and lack of concrete government regulation in the monitoring space.

## Monitoring

There are two kinds of regulated air pollution monitoring systems in India, manual and real-time. Manual monitors collect air samples from the areas where they are located, which are then tested in a laboratory for the specified air pollution parameters according to National Ambient Air Quality Standards (NAAQS).<sup>10</sup> As with any manual system, they are riddled with problems of accuracy and can only provide air pollution data with a time lag. Real-time monitors are automated and give immediate, accurate results, but are very expensive to procure and maintain.

According to a report on air pollution by the Centre for Science and Environment (CSE),<sup>11</sup> 70% of the manual monitors do not adhere to the rules laid down by the Central Pollution Control Board (CPCB) for reporting air pollution, one of which requires data from 104 days of continuous monitoring. The report says that sometimes data used is from as few as 50 days of monitoring – half of what is required.

A large percentage of the air pollution monitors are developed, tested and calibrated in the United States and Europe, where ambient conditions, the amount of dust in the air and overall air pollution are very different from that in India. Testing for dust is done with products like “Dolomite powder”, which produces dust particles of up to five or up to 10 microns. However, Indian conditions are such that dust particles of all sizes make a cocktail in the air and need to be monitored for these differences.<sup>12</sup> Air monitors measuring dust in India need a higher horsepower pump than those used in European

conditions. It is difficult to trust the data when the monitors have not been calibrated and certified to work in Indian conditions.<sup>13</sup>

The second-generation monitors are the real-time monitors which remove the need for manual intervention by using electronic methods for air pollution measurement. However, they are expensive and, again, because of a lack of India-based manufacturing (which could sufficiently bring down cost), they are not used much in India and the few that are operating are not used for legal reporting.<sup>14</sup>

A news report in 2018 claimed that the National Physical Laboratory (NPL) would start certifying instruments from September 2018.<sup>15</sup> However, another news report in April 2019 stated that the government has decided to designate the NPL as a certifying agency and that it would be ready to certify air pollution measuring instruments in two to three years.<sup>16</sup> There is still no considerable development in this area.

Air quality is also monitored in India using sensor-based equipment. These are the low-cost, easily accessible instruments, but they cannot be used for policy making because of a lack of standards. According to a 2016 report by the CSE, low-cost sensors need to be the future of regulatory monitoring in India.<sup>17</sup> However, they need to meet the standards of regulatory monitoring in order to do so. A lack of guidelines<sup>18</sup> or protocols for certifica-

7 Negi, R. (2020). Op. cit.

8 Rajshekhar, M. (2014, 14 October). Why India's numbers on air quality can't be trusted. *Economic Times*. <https://economictimes.indiatimes.com/news/environment/pollution/why-indias-numbers-on-air-quality-cant-be-trusted/articleshow/44808434.cms>

9 The Guardian. (2014, 20 October). India's air quality figures can't be trusted. *The Guardian*. <https://www.theguardian.com/environment/india-untamed/2014/oct/20/india-air-quality-delhi-polluted-city-world>

10 [https://cpb.nic.in/uploads/National\\_Ambient\\_Air\\_Quality\\_Standards.pdf](https://cpb.nic.in/uploads/National_Ambient_Air_Quality_Standards.pdf)

11 Roychowdhury, A., & Somvanshi, A. (2020). *Breathing Space: How to track and report air pollution under the National Clean Air Programme*. Centre for Science and Environment. <https://www.cseindia.org/breathing-space-9923>

12 Interview with an expert on air pollution monitoring equipment at the Centre For Science and Environment, New Delhi.

13 Sharma, S. (2019, 24 August). Reliable Air Quality Data Essential to End Air Pollution. *Hindustan Times*. <https://www.hindustantimes.com/cities/reliable-air-quality-data-essential-to-end-air-pollution/story-2TsDZ82RYN5QdHN2bXYINP.html>

14 Legal reporting would mean using data for official/policy-related purposes, which would require data that could stand in a court of law if challenged. Real-time monitors are not used for legal reporting, only for reporting daily AQI numbers, as mentioned in this article quoting a report from the Centre for Science and Environment, New Delhi: PTL. (2020, 11 February). Over 70% air quality monitoring stations not recording data properly: CSE report. *Outlook*. <https://www.outlookindia.com/newscroll/over-70-air-quality-monitoring-stations-not-recording-data-properly-cse-report/1731831>

15 Koshy, J. (2018, 27 June). Air pollution sensors to be certified from September. *The Hindu*. <https://www.thehindu.com/news/national/air-pollution-sensors-to-be-certified-from-september/article24264474.ece>

16 Choudhary, S. (2019, 30 April). India to develop own certification facility for air pollution monitoring equipment. *Mint*. <https://www.livemint.com/news/india/india-to-develop-own-certification-facility-for-air-pollution-monitoring-equipme-1556561927930.html>

17 Roychowdhury, A., Chattopadhyaya, V., & Shukla, S. (2016). *Reinventing Air Quality Monitoring: Potential of low cost alternative monitoring methods*. Centre for Science and Environment. [https://cdn.cseindia.org/attachments/o.85392300\\_1505190810\\_reinventing-air-quality-monitoring-potential-of-low-cost-dec27.pdf](https://cdn.cseindia.org/attachments/o.85392300_1505190810_reinventing-air-quality-monitoring-potential-of-low-cost-dec27.pdf)

18 Singh Bisht, D. (2019, 30 August). Sensor-based air quality monitoring instruments left out of new certification scheme. *Down To Earth*. <https://www.downtoearth.org.in/blog/air/sensor-based-air-quality-monitoring-instruments-left-out-of-new-certification-scheme-66447>

tion of sensor-based equipment makes it difficult to set up standards. A news report from August 2019 stated that the NPL would also certify low-cost sensor-based monitors,<sup>19</sup> but it is still not clear how the government would go about developing standards for such instruments.

Polash Mukerjee, an air quality expert at the National Research Development Corporation (NRDC)'s India Programme, agrees that it is difficult for sensor-based equipment to follow the standards set down for regulatory-grade monitors because of the complicated formulas they have to adhere to. However, in order to scale up and collect data for far-flung areas that are often away from the media glare, we would need to use estimated outputs from low-cost sensor-based equipment scattered all over the country rather than the few, albeit standardised ones we have right now. This could be effective. According to Mukerjee, calculating trends over the entire country should be prioritised over calculating accurate numbers of fewer areas, because air pollution does not adhere to state boundaries and needs to be addressed as a collective problem affecting the entire country. The CSE report also states that trends as reported by sensor-based monitors are accurate.<sup>20</sup>

## Mitigation

The programmes to reduce air pollution in India have gone under names such as NAMP, initially called the National Ambient Air Quality Network (1984-1985), the Graded Response Action Plan (GRAP, 2017)<sup>21</sup> or, more recently, the NCAP (as late as 2019). They work on empirico-positivist ideas of measurement and mitigation. These do not consider the impact of pollution on communities or efforts at stakeholder consultations to ensure community buy-in to help mitigate the causes of pollution. Even when based on measurements alone, monitoring efforts are not sufficient. The NCAP reports only 703 manual operating systems placed in 307 towns/cities across India's 29 states and six union territories.<sup>22</sup> A report by UrbanEmissions.info estimates that India needs 2,800 monitors in urban areas and 1,200 in rural areas for adequate monitoring data for the country.<sup>23</sup> Along with being inadequate, the NCAP report also

states that the data generated by manual monitors should be taken as indicative because of the biases and variations that creep in due to the large number of personnel and equipment used in the process.<sup>24</sup> The data quoted is itself five years old. The NCAP was also launched using the "smart cities" framework,<sup>25</sup> without any consultation with communities, when it is widely known that the smart cities project is a non-starter in India.<sup>26</sup>

Through photos, Aruna Chandrasekhar and Ishan Tankha tell the story of the people most affected by air pollution in India.<sup>27</sup> These are marginalised communities who have to live every day with debilitating conditions but have to suffer the one-measurement-fits-all approach of the government.<sup>28</sup> These communities suffer from state apathy, and are invisible to the government, even in the face of living in toxic air. Workers and residents of industrial areas in cities like Delhi suffer this fate while making substantial contributions to development. In turn they are denied the right to be counted as exceptional sufferers.

One of the most vulnerable groups to suffer the health consequences of air pollution are women, especially in villages where biofuels are used for cooking and heating purposes.<sup>29</sup> Even after liquefied petroleum gas (LPG) cylinders were distributed under the Ujjawala Scheme,<sup>30</sup> the high cost of refills, along with subsidies that one can only access with the help of universal biometric identification in India (or Aadhaar)<sup>31</sup> – and a general apathy to move to LPG because it is the women who have to suffer

24 Ministry of Environment, Forest and Climate Change. (2019). Op. cit. <http://smartcities.gov.in/content>

26 Roychowdhury, A. (2019, 18 September). Smart Cities Mission: Ambitious at the outset, progress slow after 4 years. *Business Standard*. [https://www.business-standard.com/article/economy-policy/smart-cities-mission-ambitious-at-the-outset-non-starter-after-four-years-119091800607\\_1.html](https://www.business-standard.com/article/economy-policy/smart-cities-mission-ambitious-at-the-outset-non-starter-after-four-years-119091800607_1.html)

27 Pundir, P., & Tankha, I. (2019, 11 June). These Photos Document the Most Polluted Cities in India (and the World). *Vice*. [https://www.vice.com/en\\_in/article/gy4md3/these-photos-document-the-most-polluted-cities-in-india-and-the-world](https://www.vice.com/en_in/article/gy4md3/these-photos-document-the-most-polluted-cities-in-india-and-the-world)

28 The CPCB method of calculating the average of the readings of all real-time monitors in a city is not the most scientifically accurate, as it admits on its own website, but is used for the sake of simplicity. Please refer to the AQI Bulletin: [https://cpcb.nic.in/upload/Downloads/AQI\\_Bulletin\\_20200721.pdf](https://cpcb.nic.in/upload/Downloads/AQI_Bulletin_20200721.pdf)

29 Gupta, A. (2019). Where there is smoke: Solid fuel externalities, gender, and adult respiratory health in India. *Population and Environment*, 41, 32-51; Spears, D. (2019). *Air: Pollution, Climate Change and India's Choice Between Policy and Pretence*. Harper Collins.

30 Pradhan Mantri Ujjawala Yojana: <https://pmuy.gov.in>

31 Lahoti, R. (2016). Questioning the "Phenomenal Success" of Aadhaar-linked Direct Benefit Transfers for LPG. *Economic and Political Weekly*, 51(52). <https://www.epw.in/journal/2016/52/web-exclusives/questioning-phenomenal-success-aadhaar-linked-direct-benefit>

19 Koshy, J. (2019, 26 August). CSIR to certify air quality monitoring sensors. *The Hindu*. <https://www.thehindu.com/sci-tech/energy-and-environment/csir-to-certify-air-quality-monitoring-sensors/article29254124.ece>

20 Roychowdhury, A., Chattopadhyaya, V., & Shukla, S. (2016). Op. cit. [https://cpcb.nic.in/uploads/GRAP\\_Notification.pdf](https://cpcb.nic.in/uploads/GRAP_Notification.pdf)

22 Ministry of Environment, Forest and Climate Change. (2019). Op. cit.

23 UrbanEmissions.info. (2018, 12 March). Air Pollution Monitoring 101. <https://urbanemissions.info/blog/pieces/air-monitoring-101>

the smoke – has led to a very low conversion of “chulha”-based kitchens to LPG-based ones.<sup>32</sup>

Scholars and activists would call this an issue of “data justice” which explicitly talks about the “dehumanization of decision making and interaction around sensitive issues.”<sup>33</sup> For the government, the communities that endure air pollution should be treated equally to the residents of posh residential areas, who get to sit in their drawing rooms, (now) working from home, while three air purifiers clean the air they breathe.

A number of studies show how, especially in the industrial emissions system, the numbers are either wrongly reported or the monitors are placed at locations where they report less pollution.<sup>34</sup> This is also because of a lack of any guidelines from the government for installing or maintaining the monitoring systems. A businessperson from a food company I spoke to said that if their factory gets categorised as polluting, it would become next to impossible to bring it back to an operational state because of the bureaucratic procedures and requirements.

## Conclusion

Air pollution monitoring and efforts towards mitigation lack focus in India. The result is a number of programmes, bureaucratic pronouncements and loads of money spent without any significant impact on people’s health and well-being. State Pollution Control Boards (SPCBs) have primarily existed to check on emissions and certify polluting industries, rather than keep the quality of ambient air in check. Even with the current focus on air pollution, data from SPCBs barely meets the CPCB guidelines. While real-time monitors give a near accurate description of air quality, they are expensive and hence not present in most cities, with Delhi hoarding most of them. Without real-time monitors, there is no way to know immediate air quality conditions because manual monitors report with a time lag (and often inaccurately). Indigenous manufacturing, calibration and certification to bring down

equipment costs and increase accuracy are still in their infancy.

A number of SPCBs do not even report their numbers to the public if they are not up to expectations, because they could cause a media hue and cry. People in areas that go unreported are excluded from government measures for pollution mitigation because the problem is conveniently hidden. Even when the numbers are correct, experts say, they are not used for mitigation purposes because of a lack of political will.<sup>35</sup>

Local populations need to be taken into account in order to design custom mitigation policies for the most vulnerable to climate change and pollution. Denying the existence of human sufferers in an issue such as air pollution makes policy making a slave to numbers and statistics which are open to manipulation and fabrication. What we need is rigorous data which is trustworthy, and can be used by the government to issue timely and accurate notifications to people. Research and development in low-cost devices could go a long way in getting the scale of the problem right in terms of data, even for far-flung areas of the country. Mitigation efforts should be a collaborative exercise with the communities that are most impacted, not just a punitive, bureaucratic hurdle to pass.

## Action steps

The following steps are necessary in India to improve the monitoring of air quality:

- Increase the national monitoring budget.
- Increase training and human resource development in monitoring.
- Develop robust systems for audit and maintenance, especially for regulatory-grade monitoring equipment, to reduce errors and biases.
- Make air pollution control part of health policy and measure outcomes accordingly, rather than simply relying on data that can be manipulated.
- Democratise data collection by standardising the methods for data collection. In order to get generic trends (and for quick action), we need to allow for affordable and accessible monitoring across India.
- Speed up the indigenous calibration and certification of air pollution measuring equipment.

32 Tripathi, B. (2019, 14 August). Make Cooking Gas Cheaper For Poor, Remove Subsidy For Rich: Study. *IndiaSpend*. <https://www.indiaspend.com/make-cooking-gas-cheaper-for-poor-remove-subsidy-for-rich-study>

33 Dencik, L., Hintz, A., Redden, J., & Treré, E. (2019). Exploring Data Justice: Conceptions, Applications and Directions. *Information, Communication & Society*, 22(7), 873-881. <https://doi.org/10.1080/1369118X.2019.1606268>

34 This report, for example, shows the problems that plague the installation and working of continuous emission systems and the faulty data they report: Gupta, R. (2019, 16 September). Implementation of this efficient pollution monitoring system caught in delays. *Down To Earth*. <https://www.downtoearth.org.in/news/air/implementation-of-this-efficient-pollution-monitoring-system-caught-in-delays-66746>

35 Jain, R. (2020, 9 April). Environment Law: Proposed Norms Dilute The Process Rigours, Experts Say. *Bloomberg Quint*. <https://www.bloombergquint.com/law-and-policy/environment-law-proposed-norms-dilute-the-process-rigours-experts-say>



### Digital Empowerment Foundation (DEF)

Anoushka Jha

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## Introduction

According to *The Global E-waste Monitor*, India generates about two million metric tonnes (MT) of e-waste annually and ranks fifth among e-waste producing countries after the United States, China, Japan and Germany.<sup>1</sup> In 2016-2017, India treated only 0.036 MT of e-waste, i.e. 1.8%, as compared to the world average of 20%.<sup>2</sup> Moreover, 95% of India's e-waste is recycled in the informal sector,<sup>3</sup> characterised by labyrinthine grey market networks. This leads to an increased precarity for the labour force comprising the informal e-waste sector. Since social protection and labour rights already stand eroded for informal sector workers, for informal sector workers in grey markets like e-waste dismantling, both rights and health and safety hazards stand outside reach.

The informal sector also presents significant regulatory challenges in achieving environmental objectives through formalisation. However, policy and regulatory initiatives towards reducing the environmental costs of e-waste generation have failed to recognise the social and economic reality of e-waste in the informal sector. As a result, they have trained their focus on streamlining the processing of waste through formal channels while excluding considerations of the workers whose lives and livelihoods are currently entwined with in the existing ecosystem of e-waste processing.

For example, national policies like the E-waste (Management) Rules from 2016<sup>4</sup> exclude vulnerable workers with precarious livelihoods, whose exclusion is undercut by the intersectional marginalisation of religion, caste and gender.

This report aims to foreground key considerations about labour rights within the existing debate on e-waste management policy. This is because of the double marginalisation suffered by workers in informal/illegal e-waste dismantling and refurbishment units<sup>5</sup> – firstly, as a result of being a part of the unorganised sector, and secondly, by being a part of an informal sector in the grey market. This is compounded by the unsafe working conditions for precious metal extraction in many of these informal working units, resulting in high occupational health and safety hazards. Further, a large section of the informal labour force is comprised of migrant labour. Migrant labourers do not receive social protection as a result of their migrant status, since they can only benefit from social protection offered by their own state. This results in the complete eclipse of an entire section of the workforce from the development process.

## Informality and e-waste policy in India

The 2016 E-waste (Management) Rules provided a framework for the formal e-waste ecosystem. It was hoped that this would clean the waste channels and enable the formal ecosystem to take over. Despite these initiatives, the informal sector continues to play the key role in e-waste recycling and management. The informal sector continues to receive e-waste from both informal as well as formal sources like industries. Scrap dealers contribute 38% of the e-waste flowing into the informal sector, while the formal sector, including producers, manufacturers, showrooms, etc., contribute 28% of the e-waste flowing into the sector.<sup>6</sup>

1 Baldé, C. P., Forti V., Gray, V., Kuehr, R., & Stegmann, P. (2017). *The Global E-waste Monitor 2017: Quantities, Flows and Resources*. United Nations University, International Telecommunication Union & International Solid Waste Association. <https://www.itu.int/en/ITU-D/Climate-Change/Documents/GEM%202017/Global-E-waste%20Monitor%202017%20.pdf>

2 Lahiry, S. (2019, 17 April). Recycling of e-waste in India and its potential. *Down To Earth*. <https://www.downtoearth.org.in/blog/waste/recycling-of-e-waste-in-india-and-its-potential-64034>

3 Ibid.

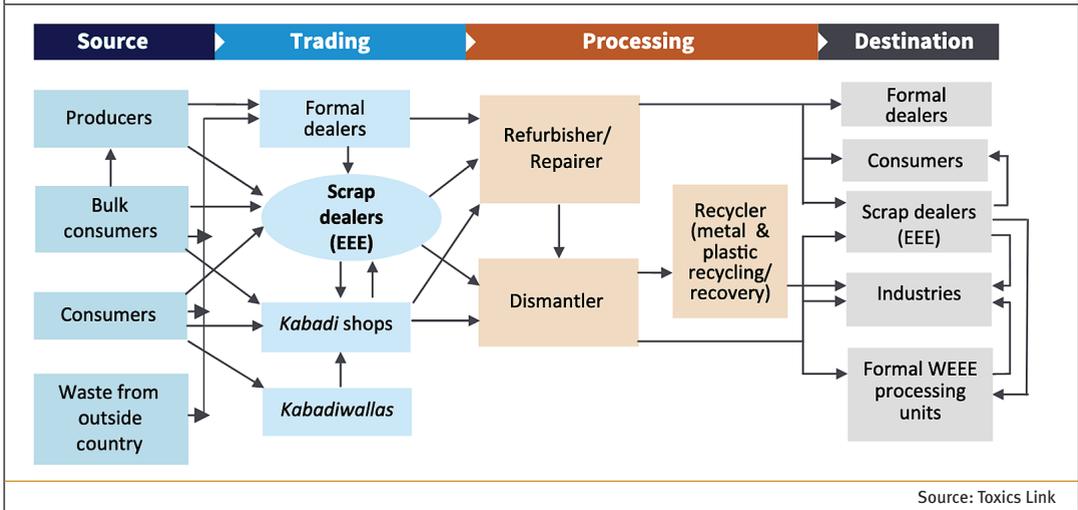
4 Ministry of Environment, Forests and Climate Change. (2016). *E-waste Management Rules, 2016*. <http://greene.gov.in/wp-content/uploads/2018/01/EWM-Rules-2016-english-23.03.2016.pdf>

5 Recycling and dismantling workshops.

6 Mahesh, P. B., & Mukherjee, M. (2019). *Informal e-waste recycling in Delhi*. Toxics Link. <http://www.indiaenvironmentportal.org.in/files/file/Informal%20E-waste.pdf>

FIGURE 1.

Informal e-waste flow chart



Source: Toxics Link

### The architecture of exclusion

The informal sector has been handling 95% of the e-waste being generated in the country.<sup>7</sup> Despite their contributions, the sector and its workers have been neglected by the government in its policies and even by the society which considers the work as dirty and menial. The informal sector has been carrying the burden of e-waste management through its network of waste collectors, segregators, dismantlers and recyclers, which often employs people from marginalised and vulnerable communities such as women,<sup>8</sup> Dalits,<sup>9</sup> and religious minorities.<sup>10</sup> However, in India, the informal sector constitutes 90%

of the workforce.<sup>11</sup> Despite the sector's significant contribution in the labour market and economy, it is not monitored by the government. As a result of remaining outside the government's regulations, the informal sector is also called a grey labour market.<sup>12</sup>

Informal e-waste workers do not have any legal rights, nor are they adequately covered under social protection schemes such as old age pensions, health insurance, maternity benefits, employee provident funds and gratuity,<sup>13</sup> unlike formal sector workers.<sup>14</sup> The workers in e-waste management even face societal discrimination<sup>15</sup> and regular threats from the law enforcement agencies, as they do not have any identification or any other form of

7 ASSOCHAM. (2016, 3 June). India's e-waste growing at 30% per annum: ASSOCHAM-cKinetics study. ASSOCHAM. <https://www.assochem.org/newsdetail.php?id=5725>

8 WIEGO, Kagad Kach Patra Kashtakari Panchayat, & Asociación Nacional de Recicladores de Colombia. (2013). Waste Pickers: The Right To Be Recognized As Workers. Position paper presented at the 102nd session of the International Labour Conference, June. <https://www.wiego.org/sites/default/files/resources/files/WIEGO-Waste-Pickers-Position-Paper.pdf>

9 Dalits are those formerly known as "untouchables" in the Indian caste system. Etymologically the word "Dalit" has its roots in Sanskrit. The root dal (dri) means "to break, crack, to split open and to crush". In current socio-political discourse, the term is used for people belonging to the Scheduled Castes (the term used for "untouchables" in the Indian constitution).

10 WIEGO, Kagad Kach Patra Kashtakari Panchayat, & Asociación Nacional de Recicladores de Colombia (2013). Op. cit.; International Labour Organization Sectoral Activities Department & Cooperatives Unit. (2014). *Tackling informality in e-waste management: The potential of cooperative enterprises*. [https://www.ilo.org/sector/Resources/publications/WCMS\\_315228/lang-en/index.htm](https://www.ilo.org/sector/Resources/publications/WCMS_315228/lang-en/index.htm)

11 Sharma, S. Y. (2020, 19 January). National database of workers in informal sector in the works. *The Economic Times*. <https://economictimes.indiatimes.com/news/economy/indicators/national-database-of-workers-in-informal-sector-in-the-works/articleshow/73394732.cms>

12 Kalyani, M. (2016). Indian informal sector: An analysis. *International Journal of Managerial Studies and Research*, 4(1), 78-85. <https://www.arcjournals.org/pdfs/ijmsr/v4-i1/9.pdf>

13 Gratuity is a term used by the Indian government; it refers to the monetary benefit given by the employer to an employee at the time of retirement under the Payment of Gratuity Act, 1972.

14 Satpathy, S. (2018). *Social Protection to Mitigate Poverty: Examining the Neglect of India's Informal Workers*. Observer Research Foundation. <https://www.orfonline.org/research/44173-social-protection-to-mitigate-poverty-examining-the-neglect-of-indias-informal-workers>; Hoda, A., & Rai, D. K. (2017). *Labour Regulations in India: Improving the Social Security Framework*. Indian Council for Research in International Economic Relations. [https://icrier.org/pdf/Working\\_Paper\\_331.pdf](https://icrier.org/pdf/Working_Paper_331.pdf)

15 Lines, K., Garside, B., Sinha, S., & Fedorenko, I. (2016). *Clean and inclusive? Recycling e-waste in China and India*. International Institute for Environment and Development. <https://greene.gov.in/wp-content/uploads/2018/01/IIED-Recycling-E-waste-in-China-and-India.pdf>

authorisation for working with e-waste.<sup>16</sup> Moreover, workers handling the e-waste often live near the waste dumping sites; they handle e-waste without any personal protection, exposing themselves to hazardous gases and substances which cause chronic ailments.<sup>17</sup>

The informal e-waste sector is marked by small enterprises, which use unsophisticated technologies with low capital cost. The workers in the sector use hazardous techniques in processing e-waste and extracting precious metals, usually in poorly ventilated workspaces, without having access to health and safety measures, including proper sanitation facilities.<sup>18</sup> While occupational health hazards remain one of the biggest concerns, the lack of social security and affordable access to health care services makes the workers' situation more precarious. Their working hours are not fixed and their living conditions are deplorable; most of them live in shanties without access to proper and safe drinking water or hygienic sanitation. Their hazardous living and working conditions increase their occupational health and safety risks.

### Balancing act: Environment, labour and development

The major issue faced by informal e-waste workers in cities like Seelampur, along with the workers in other e-waste hubs such as Moradabad in Uttar Pradesh or Sai Naka in Mumbai, is that workers are not covered under any social protection schemes. The Unorganised Workers Social Security Act, 2008 (UWSSA),<sup>19</sup> which was supposed to provide welfare schemes to workers on issues related to disability, health and maternity benefits, old age protection and any other benefit required, has failed to reach a population of 458 million working in the informal sector, including e-waste workers.

The act guarantees social protection schemes only to those people falling below the poverty line, instead of providing every worker with basic entitlements. This again leaves a huge proportion of

informal workers without a social safety net.<sup>20</sup> The act also remains silent on providing minimum conditions of work such as timely payment of wages, fixed working hours, a fixed minimum wage and special provision for women workers regarding sexual harassment.<sup>21</sup> Despite the contribution of the informal sector to the country's economic growth, the government spends less than 0.1% of GDP on the social security of these workers.<sup>22</sup> Moreover, there has been a decline in the total spending of the government on the social security of informal workers, from spending 0.09% in 2013-2014 to spending 0.07% in 2017-2018.<sup>23</sup> Because of this, the reason for the failure of the act lies in its drafting as well as inadequate budgetary allocation.

The Social Security Code Bill, 2019<sup>24</sup> aims at universalising all social security schemes. The code will set up a Central Social Security Board and state-level boards, with which the workers will need to register themselves and get an Aadhaar-linked<sup>25</sup> social security account.<sup>26</sup> Other than self-employed workers, all the workers need to establish employer-employee relationships. As per the code, the onus of getting registered rests on the worker rather the contractor, who might not register the workers.<sup>27</sup>

This becomes difficult for home-based workers such as e-waste workers who work with multiple contractors. Identifying employers is difficult, but important, as the contractors have to contribute towards the social security of workers.<sup>28</sup> Secondly, the workers have to make monetary contributions in order to avail social benefits. Those workers falling above the poverty line have to contribute 12.5% to 20% of their

16 Kanekal, S. (2019). *Challenges in the informal waste sector: Bangalore, India*. Penn Institute for Urban Research. [https://penniuir.upenn.edu/uploads/media/03\\_Kanekal.pdf](https://penniuir.upenn.edu/uploads/media/03_Kanekal.pdf)

17 Sinha, S., Mahesh, P., & Dutta, M. (2013). *Environment and Livelihood Hand in Hand*. Toxics Link. [https://toxicslink.org/docs/Environment\\_and\\_Livelihood\\_Hand\\_in\\_Hand.pdf](https://toxicslink.org/docs/Environment_and_Livelihood_Hand_in_Hand.pdf); Kanekal, S. (2019). Op. cit.

18 Sinha, S., Mahesh, P., & Dutta, M. (2013). Op. cit.; Us, V. (2006). Integrating the informal sector into the formal economy: Some policy implications. *Sosyoekonomi*, 2, 93-112. [https://www.researchgate.net/publication/273452362\\_Integrating\\_the\\_Informal\\_Sector\\_into\\_the\\_Formal\\_Economy\\_Some\\_Policy\\_Implications](https://www.researchgate.net/publication/273452362_Integrating_the_Informal_Sector_into_the_Formal_Economy_Some_Policy_Implications)

19 <https://www.ilo.org/dyn/travail/docs/686/UnorganisedWorkersSocialSecurityAct2008.pdf>

20 Us, V. (2006). Op. cit.

21 Dutta, T., & Pal, P. (2012). Politics overpowering welfare. *Economic & Political Weekly*, 47(7), 26-30. <https://www.epw.in/journal/2012/07/commentary/politics-overpowering-welfare.html>

22 Singh, J. (2018). *A Review of Unorganised Workers' Social Security Act, 2008*. Rajiv Gandhi Institute For Contemporary Studies. <https://www.rgics.org/wp-content/uploads/policy-issue-briefs/Issue-Brief-Unorganised-Workers-Social-Security-Act-A-Review.pdf>

23 Ibid.

24 [http://prsindia.org/sites/default/files/bill\\_files/Code%2000n%20Social%20Security%2C%202019.pdf](http://prsindia.org/sites/default/files/bill_files/Code%2000n%20Social%20Security%2C%202019.pdf)

25 Aadhaar is a 12-digit individual identification number issued by the Unique Identification Authority of India on behalf of the Government of India. The number serves as a proof of identity and address, anywhere in India.

26 Johari, A. (2019, 22 January). Can India's draft labour code really bring social security to its informal workers? *Scroll*. <https://scroll.in/article/909579/can-indias-draft-labour-code-really-bring-social-security-to-its-informal-workers>

27 Mehrotra, F. (2018, 20 October). Will social security become a reality for home-based workers? *The Wire*. <https://thewire.in/labour/social-security-home-based-workers-labour-code>

28 Ibid.

wages. Those below the poverty line are exempted, but they will have to periodically submit details of their income and employment.<sup>29</sup>

### *Working conditions and occupational health*

The informal e-waste workers mostly operate from their houses or backyards and from “godowns” (warehouses) where dismantling or recycling units are set up. With home becoming the place of work, the working space is often inadequate. The workers generally live in urban slums; they do not have access to proper ventilation and the lighting is often poor. They also do not have access to proper drinking water or sanitation services. The health problems associated with their work are significant.<sup>30</sup> Despite the plethora of health issues that the workers experience, they remain outside the purview of health-related social protection. The national health insurance scheme Rashtriya Swasthya Bima Yojana (RSBY), under the Unorganised Workers Social Security Act (UWSSA), 2008, provides inpatient health insurance up to INR 30,000 (USD 408.20) for a five-member family living below the poverty line.<sup>31</sup> However, it has failed to curb the outpatient costs of health care for workers. Instead, the expenditure for both inpatient and outpatient treatment increased by 30% in the year 2016.<sup>32</sup> The health insurance offered to informal workers covers health problems such as those that require surgery or hospitalisation.<sup>33</sup> Waste workers are faced with occupational health conditions such as respiratory illness, skin diseases and cuts and burns which fall under outpatient treatment, and are not covered under the health insurance scheme. This means workers spend a substantial amount of their earnings on health care.<sup>34</sup>

### *Social protection for women waste workers*

The composition of workers involved in e-waste management in the informal sector shows that women form up to 80% of the waste collectors in India. A study conducted by the Centre for Science and

Environment to understand the e-waste being generated and dismantled in Moradabad, Uttar Pradesh found that women, especially single mothers, widows and elderly women who are illiterate and do not have any other source of livelihood, are involved in dismantling the e-waste.<sup>35</sup> They work from their houses which fetches them better wages than what they would get by working as a domestic worker.<sup>36</sup>

The UWSSA does not incorporate any specific social protection schemes for women workers in terms of their equal remuneration, as women workers are often discriminated against in wages. They work longer hours, but are paid far less than male workers.<sup>37</sup> As waste workers live near the landfills so that they can get easy access to e-waste, the women are exposed to health hazards such as respiratory problems, birth defects, skin cancers and neurological problems.<sup>38</sup> This further affects their morbidity, mortality and fertility.<sup>39</sup> However, these women workers are not covered by any health and maternity benefits as mandated under the labour laws<sup>40</sup> as they continue to work under dire conditions.

The UWSSA does not even mention safe working conditions for women, such as having proper sanitation services, nor does the act say anything about sexual harassment at the workplace.<sup>41</sup> The Maternity Benefit Act, 1961 provides maternity leave for up to 26 weeks, but it only covers women working in the formal sector and those working in agricultural, commercial or industrial establishments or shops with 10

29 Johari, A. (2019, 22 January). Op. cit.

30 Sinha, S., Mahesh, P., & Dutta, M. (2013). Op. cit.

31 Satpathy, S. (2018). Op. cit.

32 Karan, A., Yip, W., & Mahal, A. (2017). Extending health insurance to the poor in India: An impact evaluation of Rashtriya Swasthya Bima Yojana on out of pocket spending for healthcare. *Social Science & Medicine*, 181, 83-92. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5408909/pdf/main.pdf>; Hoda, A., & Rai, K. D. (2017). Op. cit.

33 Satpathy, S. (2018). Op. cit.

34 Garg, C. C. (2019). *Barriers to and Inequities in Coverage and Financing of Health of the Informal Workers in India*. Institute for Human Development. <http://www.ihindia.org/Chapter%2019.pdf>

35 Centre for Science and Environment. (2015). *Recommendations to address the issues of informal sector involved in e-waste handling: Moradabad, Uttar Pradesh*. Centre for Science and Environment. <https://cdn.downtoearth.org.in/pdf/moradabad%20e-waste.pdf>

36 International Labour Office Sectoral Policies Department. (2019). *From waste to jobs: Decent work challenges and opportunities in the management of e-waste in India*. International Labour Organization. [https://www.ilo.org/sector/Resources/publications/WCMS\\_732426/lang--en/index.htm](https://www.ilo.org/sector/Resources/publications/WCMS_732426/lang--en/index.htm)

37 Goswami, P. (2009). A critique of the unorganised workers' social security act. *Economic & Political Weekly*, 44(11), 17-18. <https://www.epw.in/journal/2009/11/commentary/critique-unorganised-workers-social-security-act.html>

38 Ganguly, R. (2016). E-waste Management in India – An Overview. *International Journal of Earth Sciences and Engineering*, 9(2), 574-588. [https://www.researchgate.net/publication/305268040\\_E-waste\\_Management\\_in\\_India\\_-\\_An\\_Overview](https://www.researchgate.net/publication/305268040_E-waste_Management_in_India_-_An_Overview)

39 McAllister, L., Magee, A., & Hale, B. (2014). Women, E-waste, and Technological Solutions to Climate Change. *Health and Human Rights Journal*, 16(1), 166-178. <https://cdn2.sph.harvard.edu/wp-content/uploads/sites/13/2014/06/McAllister1.pdf>

40 International Labour Office Sectoral Policies Department. (2019). Op. cit.

41 Goswami, P. (2009). Op. cit.

persons or more, leaving out women working from home such as informal e-waste workers.<sup>42</sup>

### Minimum wages and social protection

In India, wages for menial work are fixed by the state government, as per the Minimum Wages Act. The minimum wage for an unskilled worker in Delhi is INR 569<sup>43</sup> (USD 7.59), while the majority of waste workers earn INR 200 per day (USD 2.67) in the city.<sup>44</sup> Although the wages earned in the informal e-waste sector are far less than what is mandated by the government, workers often do not even receive their payments on time,<sup>45</sup> the wage structures are unequal for migrant workers,<sup>46</sup> and women e-waste workers get paid less for equal or even longer working hours.<sup>47</sup>

The informal e-waste sector employs many migrant workers who come to cities looking for livelihood opportunities. These migrant workers do not have any prior skills, and are not protected by legislation. As a result, they are absorbed into the e-waste sector and provide cheap and flexible labour.<sup>48</sup> The migrant workers receive far lower wages compared to local workers.

There is no provision to ensure timely payment of wages in the legislation. The non-payment of wages and delays in payment are the major issues that workers have to constantly face. This also makes it difficult for the waste workers to contribute a certain percentage of their wages as mandated under the Social Security Code Bill to receive the benefit of social protection.

The Pradhan Mantri Shram Yogi Maan-dhan (PM-SYM) scheme is a contributory pension plan for informal workers, including those working in waste management. Under the scheme, the worker receives an amount of INR 3,000 (USD 40.8) per month after their retirement (60 years of age) after

paying a premium for 20 years.<sup>49</sup> Workers in the age group of 18-29 would have to contribute INR 55 (USD 0.7) while those above 29 years would have to contribute INR 100 (USD 1.4) per month. However, the scheme is only for workers in the age group of 18-40 years, leaving behind those in the age group of 40-60 years. The monthly contributions can also be difficult for informal waste workers who might not earn enough to pitch in with their contribution.<sup>50</sup>

### Conclusion

The existing laws like the Unorganised Workers Social Security Act, 2008 and Social Security Bill, 2019 have failed to recognise the vulnerable condition of waste workers and provide a roadmap for their social and economic upliftment. The e-waste rules have presented a robust framework to channel e-waste in the formal sectors, but have fallen short on recognising the important role played by the informal e-waste economy. Instead, it would rather stop “waste leakages” to the informal sector. Provisions such as extended producer responsibility (EPR) have been introduced, where it is the responsibility of the producer of the electronic or electrical equipment to channel the e-waste to authorised dismantlers and recyclers through take-back systems or setting up collection centres. Collection targets have been set for the producers of the product to collect the electronic and electrical items once they reach their end of life and transfer the e-waste to authorised recyclers and dismantlers.<sup>51</sup>

The process of formalising the informal sector wage workers means obtaining a secure job with worker benefits and social protection. Worker rights include providing for minimum wages, ensuring occupational health and safety measures, providing legal recognition and protection, as well as providing workers with employer contributions in health and pension coverage.<sup>52</sup>

Under the E-waste (Management) Rules, 2016,<sup>53</sup> it is the responsibility of the state labour department to formalise informal waste workers

42 Rao, M. (2016, 13 August). Maternity leave increases to 26 weeks – but only for a small section of Indian women. *Scroll*. <https://scroll.in/pulse/813888/maternity-leave-increases-to-26-weeks-but-only-for-a-small-section-of-indian-women>

43 [https://labour.delhi.gov.in/sites/default/files/All-PDF/Order\\_MW2019.pdf](https://labour.delhi.gov.in/sites/default/files/All-PDF/Order_MW2019.pdf)

44 Bhaduri, A. (2018, 17 April). Down in the Dumps: The Tale of Delhi's Waste Pickers. *The Wire*. <https://thewire.in/health/down-in-the-dumps-the-tale-of-delhis-waste-pickers>

45 Goswami, P. (2009). Op. cit.

46 Sinha, S., Mahesh, P., & Dutta, M. (2013). Op. cit.

47 Ibid.

48 National Commission for Enterprises in the Unorganised Sector. (2007). *Report on Conditions of Work and Promotion of Livelihoods in the Unorganised Sector*. [https://dcmsme.gov.in/Condition\\_of\\_workers\\_sep\\_2007.pdf](https://dcmsme.gov.in/Condition_of_workers_sep_2007.pdf)

49 Ratho, A. (2019, 30 October). Will new social security schemes provide relief to the informal sector? *Observer Research Foundation*. <https://www.orfonline.org/expert-speak/will-new-social-security-schemes-provide-relief-informal-sector-57105>

50 Sane, R. (2019, 14 March). Two pension schemes, one problem: What Modi govt didn't learn. *The Print*. <https://theprint.in/opinion/two-pension-schemes-one-problem-what-modi-govt-didnt-learn/205018>

51 Ministry of Environment, Forests and Climate Change. (2016). Op. cit.

52 Chen, M. A. (2012). *The Informal Economy: Definitions, Theories and Policies*. WIEGO. [https://www.wiego.org/sites/default/files/publications/files/Chen\\_WIEGO\\_WP1.pdf](https://www.wiego.org/sites/default/files/publications/files/Chen_WIEGO_WP1.pdf)

53 Ministry of Environment, Forests and Climate Change. (2016). Op. cit.

by recognising and registering workers in dismantling and recycling and providing them with training on handling e-waste.<sup>54</sup> However, the explicit process of formalising informal sector workers that is necessary is absent from the rules. Moreover, the process of formalisation is a gradual process and it might not be feasible to suddenly formalise the work lives of all informal workers at once. Instead, there would be certain sections of the informal workforce that would continue to work as they have been.<sup>55</sup>

A study on the informal sector recyclers in Delhi found that post privatisation, 50% of the waste pickers lost their jobs or suffered a decrease in their income. The practice of sharing among waste pickers also reduced, which caused fewer people to earn from the same share of waste. Moreover, due to inflexible working hours, many women were left out, as they were not able to handle both waste picking work and household work.<sup>56</sup>

If the rules are effective in stopping the flow of e-waste to the informal sector, then it would have a direct impact on the livelihood of urban poor who are engaged in collection, trading and recycling of e-waste.<sup>57</sup> Moreover, the informal e-waste sector is both socially and environmentally important; socially by employing people who might not be able to find other work, and environmentally because the manual dismantling of e-waste is important for efficiency in the second-tier formal recycling processes.<sup>58</sup>

There is a need to understand the nuanced role of informal sector waste workers and provide them with the cushion of social security. This would enable not only the better management of e-waste in the country, but would also facilitate the linkages between the formal and informal e-waste economy.

## Action steps

The following steps are necessary:

- **Better working conditions:** The informal sector involved in e-waste management has always been seen as a secondary player and has been excluded from the regulations and major policies.<sup>59</sup> There is a need to lobby for basic social protection for informal e-waste workers, such as fixed working hours, leisure time, ensuring minimum wages and due payment of wages (wages given to informal workers need to be strictly monitored in line with the Minimum Wages Act). There is also a need to provide better working conditions such as safe workspaces and other basic amenities for home-based informal waste workers.<sup>60</sup>
- **Ensuring social security benefits for women workers:** Women wage workers should be given equal remuneration for their work under the Equal Remuneration Act; the wages should be monitored by forming an employment certification committee that would specifically look into the matter of equal remuneration. The informal workers should be included in the Maternity Benefit Act and the benefits should be linked to wages. Due protection from sexual harassment should be provided to women by forming a complaints committee for wage workers at district and sub-district levels under the Sexual Harassment at the Workplace Act, 2013.<sup>61</sup>
- **Ensuring occupational health and safety:** E-waste workers are constantly handling hazardous waste and chemicals. The current health insurance programme Rashtriya Swasthya Bima Yojana should also cover outpatient services.<sup>62</sup> This would reduce the medical expenses of workers and will ensure affordability and accessibility of health care services. Contractors should also provide waste workers with adequate tools and safety equipment for handling hazardous substances.<sup>63</sup>

54 Ganesan, R. (2016, 23 March). New E-waste rules announced. *Down To Earth*. <https://www.downtoearth.org.in/news/waste/new-e-waste-rules-announced-welcome-change-from-the-previous-set-53289>

55 Chen, M. A. (2012). Op. cit.

56 Chaturvedi, B., & Gidwani, V. (2010). *The right to waste: Informal sector recyclers and struggles for social justice in post-reform urban India*. In W. Ahmed, A. Kundu, & R. Peet (Eds.), *India's New Economic Policy: A critical analysis*. Routledge. [https://www.academia.edu/30124057/The\\_Right\\_To\\_Waste\\_Informal\\_Sector\\_Recyclers\\_and\\_Struggles\\_for\\_Social\\_Justice\\_in\\_Post-Reform\\_India\\_2010\\_](https://www.academia.edu/30124057/The_Right_To_Waste_Informal_Sector_Recyclers_and_Struggles_for_Social_Justice_in_Post-Reform_India_2010_)

57 Lines, K., Garside, B., Sinha, S., & Fedorenko, I. (2016). Op. cit.

58 Sinha, S., Mahesh, P., & Dutta, M. (2013). Op. cit.

59 Turaga, R. M. R., Bhaskar, K., et al. (2019). E-waste Management in India: Issues and Strategies. *Vikalpa*, 44(3), 127-162. <https://journals.sagepub.com/doi/pdf/10.1177/0256090919880655>

60 National Commission for Enterprises in the Unorganised Sector. (2007). Op. cit.

61 Ibid.

62 Karan, A. (2017, 11 October). India's flagship health insurance scheme for the poor has failed to cut medical expenses. Here's why. *Scroll*. <https://scroll.in/pulse/853652/indias-flagship-health-insurance-scheme-for-the-poor-has-failed-to-cut-medical-expenses-heres-why>

63 National Commission for Enterprises in the Unorganised Sector. (2007). Op. cit.

- *Universalising social protection:* Although the Social Security Code Bill, 2019, talks about universalising social security, it plans to implement it in a contributory way, where both the worker and the government will contribute an amount. This becomes an exclusionary criterion in itself, because many informal wage workers might not have the required amount to be pitched in monthly to access the social security benefit.<sup>64</sup> Instead, all the workers should be provided with social safety nets. Moreover, the Social Security Code Bill requires contractors to register workers, but in case they fail to do so, fines should be levied.<sup>65</sup>
- *Recognising the model of privatisation from below:* E-waste policies should recognise e-waste as a source of income and wealth, not only for authorised entities. E-waste can also be a means for large-scale poverty alleviation in the cities and would even add to environmental sustainability by allowing the maximum recovery of precious materials that would reduce the dependence on the extractive mining of these materials.<sup>66</sup> At the same time, NGOs can play a role in training informal workers in safety and health measures and risks, and in practising the environmentally sustainable recycling of e-waste.

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<sup>64</sup> Johari, A. (2019, 22 January). Op. cit.

<sup>65</sup> Mehrotra, F. (2018, 20 October). Op. cit.

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<sup>66</sup> Turaga, R. M. R., Bhaskar, K., et al. (2019). Op.cit.; Chaturvedi, B., & Gidwani, V. (2010). Op. cit.