Solid Waste Management and Women's Livelihoods in Pune: A Desired Future

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3D Program
FOR GIRLS & WOMEN

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3D Program for Girls and Women

Contributing to the implementation of the Sustainable Development Goals (SDGs), the 3D Program for Girls and Women advances gender equality and girls' and women's empowerment by facilitating convergent action across stakeholders and sectors to increase economic opportunities for girls and women and address their health, education and safety needs. The 3D Program is currently working with partners in Pune City and rural Pune District, Maharashtra State, India to identify priority issues and link stakeholders to provide cross-sectoral, coordinated solutions to meet the multiple, intersecting needs of girls and women. The Program is deriving lessons learned and developing tools for global application of a scaled-up convergent response for gender equality by demonstrating a convergent approach to programming in India and East Africa.

Centre for Environment Education

The Centre for Environment Education (CEE) was established in 1984 as a 'Centre of Excellence in Environmental Education' of the Ministry of Environment, Forest and Climate Change (MoEFCC), Government of India. CEE, a national institution with its headquarters in Ahmedabad, has a mandate to promote environmental awareness nationwide. CEE develops innovative programs and educational material and builds capacity in the field of education and communication for sustainable development. It undertakes demonstration projects in education, communication and development that endorse attitudes, strategies and technologies that are environmentally sustainable. Education for sustainable development in the urban context and solid waste management are among the thrust areas of CEE's work.

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Abbreviations

APCCI	Adar Poonawalla Clean City Initiative
BPL	Below poverty line
CSO	Civil society organization
C&D	Construction and demolition
CSR	Corporate social responsibility
EPR	Extended producer responsibility
GR	Government resolution
INR	Indian Rupee
IEC	Information, education and communication
IT	Information technology
KKPKP	Kagad Kach Patra Kashtakari Panchayat
MPCB	Maharashtra Pollution Control Board
MRF	Materials recovery facility
MT	Metric ton
M&E	Monitoring and evaluation
MSW	Municipal solid waste
NGT	National Green Tribunal
OWC	Organic waste converters
PCMC	Pimpri Chinchwad Municipal Corporation
PMU	Project management unit
PMC	Pune Municipal Corporation
PSCDL	Pune Smart City Development Corporation, Limited
SWaCH	Solid Waste Collection and Handling
SWM	Solid waste management
SPV	Special purpose vehicle
SBM	Swachh Bharat Mission

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Context and Stakeholders

Maharashtra is one of the largest states in India, with 10% of India's population. Over the past few decades, there has been progress on indicators related to girls' and women's status. There are government leadership and investments in a wide range of programs to address the needs of girls and women. The state also has a strong tradition of community organizing and women mobilizing. The corporate sector has a growing engagement with and investments in social development. However, there is still considerable room for improvement in the status of girls and women, particularly those from low-income communities.

Pune City, Maharashtra's second largest city, has been designated a 'Smart City' by the Government of India. The city offers unique opportunities and challenges for development and convergent action, building on well-established government systems, strong social justice movements and growing private sector investments. With a population of about 3.1 million, the city has the 6th highest per capita income in India. Officially, about 2.73% of the population is below the poverty line, but 40% live in slums.

The solid waste management (SWM) sector presents a significant opportunity to strengthen the livelihoods of vulnerable and economically disadvantaged women and other workers in the waste sector and achieve environmental, health and public safety benefits. With this in mind, the 3D Program is focusing on waste pickers and their collective action platforms in Pune. The Program is facilitating convergent action by engaging the Pune Municipal Corporation (PMC), the Pune Smart City Development Corporation Limited, the waste pickers trade union Kagad Kach Patra Kashtakari Panchayat (KKPKP), the waste pickers cooperative, Solid Waste Collection and Handling, (SWaCH), the Centre for Environment Education (CEE) and a private sector philanthropist to strengthen women's livelihoods and occupational safety while improving their access to social programs and entitlements across sectors, including health, education and financial inclusion.

This report describes the findings of a study supported as part of this larger initiative that was conducted with the approval of the former Pune Municipal Commissioner Shri Kunal Kumar from November to May 2018. The findings and recommendations in this report are based on a review of SWM models across India, as well as interviews with key stakeholders at the state- and city-levels. The study also draws on the considerable expertise in advocacy, SWM, environmental and municipal systems within KKPKP, SWaCH and CEE to provide a blueprint for a desired future for SWM in Pune City through convergent action that also protects and advances the economic and social wellbeing of waste pickers in the city, 70 percent of whom are women.

Local Government Approaches and Partnerships

The Pune Municipal Corporation (PMC) is the local self-government body of Pune city. It is one of two municipal corporations providing administrative management in the larger Pune urban area.[1] Solid waste management, poverty alleviation and employment generation are among its constitutional responsibilities devolved under the 74th Constitutional Amendment Act and the Maharashtra Municipal Corporations Act.

The PMC has a rich legacy of innovation and experimentation in solid waste management (SWM). It has pioneered a city-wide pro-poor, public-private agreement to manage solid waste, in partnership with an autonomous cooperative of waste pickers engaged in providing front-end waste management services for the citizens of Pune, that has resulted in significant diversion of recyclables from city landfills. PMC boasts of relatively high rates of source segregation of waste, and has 18 bio-methanation plants of five metric tons (MT) capacity[2] functioning in each ward.

1. The other municipal corporation is Pimpri-Chinchwad Municipal Corporation (PCMC). Both are headed by Municipal Commissioners, who are officers of the Indian Administrative Service (IAS) appointed by the Government of Maharashtra. Key departments under PMC and PCMC include General Administration, Social Welfare, Solid Waste Management, Information Technology, Health, Nature and Environment, Revenue, Engineering, and Emergency Services.

2. Pune Municipal Corporation, Environment Status Report, 2016-17 (draft). [ONLINE] Available at: https://pmc.gov.in/en/environment-status-report-2016-17-draft. [Accessed 15 March 2018].

There are also a large number of compost units in the city that help reduce the volume of organic waste going to the landfill. As per local building bye-laws, all buildings constructed after the year 2000 must have built-in composting pits.

While these SWM fundamentals might be stronger in the PMC than in other municipalities, the pressure of having a visibly clean city causes officials and politicians to periodically consider more centralized processes that are not the most effective. Additionally, the current SWM financial, governance and administrative structure within the PMC continues to mirror existing SWM departments across India, and is not necessarily conducive to the expansion and institutionalization of more sustainable and equitable decentralized, inclusive models being tried in the city. To ensure that some of the best practices sustain, the following are required: systematic and consistent financial investment, a creative and sustained outreach strategy to all stakeholders (including citizens and businesses), and governance mechanisms that encourage the participation of the private sector and citizens.

Citizen Engagement

At the citizen level, one sees a wide spectrum of attitudes towards waste management. While people largely understand the need to segregate waste and the importance of recycling, there is frustration with the inability of the city's SWM mechanism to provide clear and consistent means to ensure that this happens. While the city's bye-laws require larger housing societies to compost their own wet waste, the flaws in the design and construction of composting pits and the absence of meaningful technical support on composting has led to low rates of compliance. In addition, the city's system of *ghanta gaadis* (trucks of varying sizes that pick up mixed and segregated waste from residential areas) can always be relied upon to take away the wet and organic waste. This practice is either informally arranged or facilitated by elected representatives who are generally loathe to antagonize citizens and put pressure on the system to accommodate non-compliant residential societies. Any attempts by the administration to penalize non-compliance or violations of SWM rules are generally resisted by citizens, with the backing of their elected representatives.

Waste Picker Collectives and Partnerships

Kagad Kach Patra Kashtakari Panchayat (KKPKP) is a trade union of waste pickers established in 1993 to assert the rights of waste pickers to security of livelihoods, better work conditions, social welfare programs, and recognition by the municipality. It operates in the twin cities of Pune and Pimpri-Chinchwad and has 7,000 active members – both waste pickers and itinerant scrap buyers. KKPKP has ensured recognition of waste pickers through identity cards issued by the municipal corporations. It runs a credit cooperative for loans and fights for access to healthcare, education and minimum wages for its members. It has also run campaigns against child labor and child marriage and citizen campaigns to increase awareness about the need to segregate waste. KKPKP was also the stepping stone towards the creation of Solid Waste Collection and Handling (SWaCH),[3] a cooperative wholly owned by waste pickers, authorized by the Pune Municipal Corporation for door-to-door waste collection.

SWaCH came into existence in 2007 after a pilot program was initiated by KKPKP in the aftermath of the Municipal Solid Waste (MSW) 2000 Rules, which required segregation of waste by generators and pro-

3. For more information, see http://www.kkpkp-pune.org

vision of doorstep collection services by the local authority. SWaCH operates under a contract signed with the Municipality (first from 2008-2013, and renewed for 2016-2020) under which the PMC pays for administrative costs and provides equipment for the members. User fees are collected from households and commercial properties that are serviced. Currently, SWaCH has over 3,000 members engaged in doorstep collection covering over 620,000 properties, about 50% of the city.[4]

The presence of KKPKP and the success of the SWaCH model in Pune are recognized as essential elements on which to build a more comprehensive sustainable decentralized model of waste management.

Private Sector Involvement

In Pune, the private sector is involved in SWM in the following roles:

Philanthropic and public service contributions

The Adar Poonawalla Clean City Initiative (APCCI) is a very large private sector effort aimed at helping the city reduce visible waste (litter) on the streets by operating waste collection services (street vacuum cleaners), installing litter bins and delivering this waste to the PMC's secondary collection system. These services are not integrated into the Municipal system and APCCI funds them fully and directly.

Contracted agencies

Several bio-methanation plants are operated under contract by private agencies. Hanjer and Disha are two large waste processing plants under contract. Smaller contracted agencies include small sanitary waste incinerators. The bio-medical waste collection and processing system is operated by Passco Environmental Solutions Private Limited.

Private enterprise

There are several small private entrepreneurs who offer waste collection services, including doorstep collection of certain recyclables. Various types of waste materials are purchased at advertised rates. Some of these initiatives convert plastic to fuel.[5] The volume of waste collected by such agencies is fairly small. The sustainability of these services is also unknown. However, this does indicate that private companies will be interested in some components of dry waste, thus potentially affecting the incomes of waste pickers and itinerant buyers.

Figure 1: Advertisement of a private service for doorstep pickup of recyclables offering incentives such as use of electronic weigh scales and rates that are 30% higher than market rates.

4. For more information, see https://swachcoop.com

5. For example, http://rudraenvsolution.com

Box 1: Waste Character in Pune and Implications for Solid Waste Management

A 2015 waste characterization study carried out by SWaCH found that waste in Pune (by weight) is comprised of:

72% organic waste, including food and vegetable scraps and garden waste

20% of recyclable waste, including paper, plastic, metal and glass

3% sanitary waste, including diapers, menstrual products, and other materials with blood or bodily fluids

5% inert materials, including sand, street sweeping and debris

The large proportion of organic waste has several implications:

- Sustainable management of organic waste must be addressed in any SWM plans
- If organic waste is not segregated at source and managed separately, it undermines the recovery and recyclability of those materials that can be recycled
- Reduction in the quantum or quality of the recyclable materials impacts waste picker livelihoods; high quality source segregation can also adversely impact waste picker livelihoods when these pre-segregated materials become of economic interest to other recycling agents
- The transportation of mixed or organic waste across the city in the old paradigm of 'collect and dump' is expensive
- The improper dumping of large quantities of mixed waste poses significant public health challenges, including the generation of methane.

Methodology and Findings

The initial conception of an improved and more sustainable model for SWM and how the city might transition to it were part of an ongoing deliberation of the leadership of KKPKP and SWaCH with the authors. The proposal to undertake a more formal study and exploration with key stakeholders and experts was developed in partnership with the 3D Program for Girls and Women under its mandate to facilitate convergent action across sectors and stakeholders to benefit low-income women and their families, including a focus on sustainable livelihoods, increased access to social welfare programs, and occupational and public safety. The study was formally initiated in December 2017.

Methodology

The study methods included a review of relevant legislation, guidelines and reports related to SWM in Pune, the State of Maharashtra and India; and interviews with 14 key informants, individuals with experience and insights in SWM in Pune, in other cities, and at the state or national levels.[6]

The authors also drew upon discussions carried out in the past seven years with citizens and citizens' groups in Pune, and with officials in Pune and Pimpri Chinchwad as part of voluntary processes to develop draft bye-laws for the two cities.

In discussion with the 3D Program, the authors formulated a broad outline of discussion points and questions for the interviews with key stakeholders. Almost all the key informants who were interviewed are very or reasonably familiar with the work of KKPKP and SWaCH and existing agreements with the Municipality.

The questions explored reactions to a proposed model of SWM, possibly housed in an Special Purpose Vehicle (SPV),[7] with high source segregation and *in situ* composting, with waste pickers collecting and sorting dry waste, recovering recyclables and channeling them away from landfills to scrap shops to earn their livelihoods. Such a model has implications for waste pickers' livelihoods as it may restrict the number of waste pickers engaged and may require waste pickers to be hired by a private agency.

Key informants were asked:

- Does the proposed model have merit? (In other words, is it sound?) And is it possible to envisage such a model being implemented on the ground? (In other words, is it practical)?
- Is an independent SPV the right structure for the implementation of this model? Is there a need to set up a new SPV or can an existing one, such as Pune Smart City Development Corporation, Limited (PSCDCL) serve as a suitable platform?

Interviews typically began with a discussion on current mechanisms of waste management in Pune, briefly explored how, in the respondent's view, the Swachh Bharat Mission (SBM)[8] is driving the sector, and then introduced the idea of high levels of source segregation and 100% *in situ* composting as a broad model for the future, in line with the SWM 2016 rules. Discussions explored the feasibility of such a model, and what the barriers and enabling factors would be. The potential impact on waste pickers and SWaCH and the ability to adapt to such a change was explored with some key informants. Issues of access to generic welfare benefits and services, as well as occupational safety and worker benefits were also discussed more in detail with these key informants.

The broad findings from the interviews and literature review were then deliberated upon with the KKPKP

6. A full list of key informants is included in the Appendix.

7. The Government of India is using Special Purpose Vehicles (SPVs) as a public-private management model that combines the structure and purpose of a government-controlled body with the nimbleness of the private sector to achieve specific goals in key policy areas. The Pune Smart City Development Corporation Limited is an example of an SPV. The central government as well as state governments in India set up Special Purpose Vehicles, usually as government-owned companies with a single, well-defined, narrow purpose, and the ability to 'raise funds by collateralizing future receivables.' See https://www.financialexpress.com/archive/what-is-a-special-purpose-vehicle/129610/

8. The Prime Minister of India launched the Swachh Bharat Mission (SBM) in 2014, with the aim of achieving a clean and Open Defecation Free (ODF) India by October 2019. For more information, see http://swachhbharatmission.gov.in/sbmcms/index.htm

and SWaCH leadership to design a more detailed environmentally sound and socially relevant SWM model, a role for waste pickers, and improved mechanisms for worker safety and welfare. This model was deliberated upon with the 3D Program team, PSCDCL and the Urban Development Department, and further refined.

The findings from the initial discussions are presented in this section. The sections that follow present the model and potential next steps for realization of the model.

Findings from Interviews with Key Informants

General Responses to the Proposed Model

Almost all the key informants, *prima facie*, felt that an SWM model based on high levels of segregation and *in situ* composting is a good concept, and can and should be implemented.

A few additional observations were offered. The head of an environmental social enterprise suggested that instead of composting, conversion to biofuels, briquettes and biochar may be a better option to derive benefit of carbon offsets and sinks from waste management.

A representative from a public policy think tank observed that getting all citizens and societies to compost all their wet waste all the time poses challenges in terms of their commitment and ability, and the city should plan to deal with such contingencies. He also felt that waste generation patterns change over time which could impact the system's ability to cope. He observed that it would be challenging to require citizens to be responsible for managing their own wet waste and was concerned about public health risks, if a community was unable to do it well. He also argued that a 100% decentralized wet waste composting model will require the installation of a large, labor-intensive distributed processing system. Continued availability of labor may be challenging and the increase in labor costs may threaten such a decentralized system.

He also wondered if it was prudent to lock-in to such a system that may prevent the adoption of other solutions, as and when they emerge, including cheaper or environmentally-better centralized waste processing options. He did not feel that having multiple systems operating in a city would be an issue. In fact, considering the diversity and the rapidly changing urban scenario in India, he felt that such multiplicity of systems is inevitable and perhaps even desirable. He suggested that a possible intermediate step towards more decentralized waste management (if not towards 100% wet waste processing) could be to formally adopt decentralized governance structures and targets to be met by the appropriate administrative unit.

Box 2: Overview of Discussions with Key Informants

Current and future SWM models

- Current models include "city should look clean"/collect and transport/partial decentralized collection and sorting
- MSW Rule 2016 encourages decentralized processing, recovery of materials and energy
- Comments on existing models, major gaps, what is most desirable
- Possibility of shifting to a new model of 100% segregation and *in situ* composting at the household/society/community level, and continuing waste picker integration

The type of institutional structure that will deliver the desired functionality

- Planning (annual, mid- and long-term)
- Operations
  - Mechanisms to facilitate *in situ*/decentralized composting
  - Mechanisms to facilitate materials recovery
  - Different streams of waste: biomedical, e-waste, construction and demolition materials (C&D), hotel, garden, etc.
  - Secondary operations and landfill management
  - Information, education and communication (IEC), customer engagement, grievance redress
- Enforcement and penalties management
- Integration of waste pickers, labor laws and internal grievances
- Facilitating innovation, studies, research, data and record keeping and reporting
- How to handle extended producer responsibility (EPR)
- Finance – revenue streams for capital investments, operations, innovations/projects, determining user fees

The barriers, constraints, challenges, opportunities for transition to the new model based on 100% *in situ* composting

- Mindsets/legacy systems
- Physical space
- Capabilities and capacities
- Technology
- Public awareness/interest motivation
- Is the Swachh Bharat Mission (SBM) helping? In what ways?

Enabling/Driving transformation

- Law/procedure/state policy – does municipal law already permit creation of new institutional structures/what specific changes may be needed
- What mechanisms can help cities take on the transformation Recommendations for state policy
- Guided implementation of changes
- Training
- Requires political buy-in, and if so, how may the political discussion happen?

Impact on SWaCH and waste pickers' livelihoods (for informants closely related to SWaCH)

- Impact on SwaCH
- Will SWaCH be able to adapt?

Box 3: Highlights from Key Informant Interviews

KEY QUESTIONS	Number of informants who stressed this point (N=14)
The proposed model of decentralized in situ composting is good and can and should be implemented	14
The most significant barriers to such a model are likely to be:	
• Political will	4
• Cost of composting	3
• Composting unit management issues	3
• Public perceptions against composting	3
Space for composting will not be a constraint for such a model	3
Institutional Options	
• PMC SWM Department structure and functioning will need considerable change to implement such a model	6
• An independent new SPV is not a good idea	6
• PSCDL can be an appropriate mechanism to develop the transition	5
• PMC should be the entity to develop and implement the model	2
• A mix of PMC staff and technical experts will be needed as a dedicated team to develop and implement the model	5
Current SWaCH model is excellent	8
Waste pickers will be adversely impacted, and a range of measures will be needed to protect their livelihoods	5
Operationalization of the *in situ* composting model can be done through:	
• Bylaws that mandate *in situ* composting	3
• Property tax to incentivize composting or discourage mixed waste	2
• Buy back, enrich, certify and sell compost (to farmers, niche markets)	3
• PMC to empanel and pay service providers directly	1
• Subsidies (are not a good idea)	3
Key functions of the implementing entity:	
• Area-specific micro-planning	4
• Strong coordination between various service providers	2
• Behavior change communications and facilitation	4
• Welfare and protection of livelihoods of waste collectors	4

Anticipated Barriers to the Proposed Model

The top three barriers to the development and implementation of such a model, mentioned by four key informants were:

- The political will to make composting compulsory
- The cost of composting (both capital and operational costs)
- Issues related to operating compost pits, such as smell, which citizens protest about

Other barriers mentioned were:

- Existing PMC SWM organizational structures which are not conducive to such a model.
- Attitudes, integrity and commitment of ground level and supervisory PMC staff. For example, PMC ground staff may not cooperate; the informality of SWM source segregation adds to their power of granting favors and refusing services.
- Attitudes, integrity and commitment of various private sector service providers.
- Inadequate enforcement of the requirement for buildings post-2000 to set up *in situ* composting. Many have not done so, or have non-functional units.
- Coordination between multiple agencies is a complex task, for PMC or any other entity managing operations in the new model.
- Improper infrastructure for composting (pit design, failure of Organic Waste Converters (OWCs), which can undermine functioning, and lead to abandoning of composting.
- Incorrect perceptions or myths about composting that lead to non-adoption.
- Lack of trained individuals for composting, as well as supply chain for setting up and operationalizing compost units can be a limiting factor initially, in the scale up of current levels of decentralized composting to all 70,000 to 80,000 properties in the Smart City area.
- The quality of compost and lack of a nearby market.

Organization of the Proposed Model

SBM officials as well as local government officials felt that the decentralized *in situ* composting model can work if the PMC fully backs and regulates the system. Enforcement will have to include the right to refuse collection if waste is not source segregated. Detailed area-specific micro-planning with technical experts will be needed.

All local government officials articulated that the PMC should play the role of facilitator and invest in social and behavior change communication with attention to detail (e.g. in the framing of the public notices, elected representatives suggest that the language should not be harsh). Politicians go by what citizens demand and the communication effort would have to be innovative to generate engagement with the new model.

One suggestion for the organizational arrangements was to divide up all the functions into the following categories and roles:

- Regulate (PMC)
- Plan (through a City Connect[9] type of partnership)
- Operate (contracted)

Other organizational suggestions include:

- Training of collectors at generator level, compost workers and service providers
- Innovations in use of public spaces for composting. At least three informants felt that space is

not a constraint as composting can be done on rooftops, and in niches of public spaces, including roadsides, amenities and open spaces.

Role of SWaCH and Impact on Waste Pickers' Livelihoods

The current SWaCH model was deeply appreciated by all key informants. In the words of the SWB officials, "(the) waste collector is the biggest instrument to drive segregation". While local officials feel that political acceptance of the SWaCH model is low and that professionalism of the service should improve, some observed that:

- SWaCH should extend its services across the city, beyond the 50% of the city it currently covers.
- Segregation level is better where SWaCH services are present.
- The operation and maintenance cost of SWM through SWaCH is considerably lower (INR 65 per ton) than that of any private contractor (averages INR 1600 per ton) and PMC ghanta trucks (INR 3,000 per ton).[10]
- In addition to providing a SWM service, the model also helps PMC fulfill its obligations of 'urban proverty alleviation'.

There were mixed perceptions about the Swachh Sarvekshan survey[11] and ranking of cities under the SBM (Urban), including:

- Sarvekshan is inclined towards optics (one non-government key informant)
- SBM has helped promote the cleanliness agenda and is aligned with segregation and composting (two officials)

Moving forward, several key informants felt that the value that SWaCH offers to generators of waste and to society will need to be repackaged and promoted. Currently, only 'collection' is recognized as a service that SWaCH provides to the public. The contribution that waste collectors make to fine sorting, recovery of recyclable materials and channeling the recyclables away from the landfill to the scrap shops are not well understood or recognized by the public or even those in charge of developing the SWM systems.

All those working directly with informal sector groups expressed the concern that while a high level of source segregation is essential for composting, waste picker livelihoods will be threatened. Specifically:

- The new model will likely mean the loss of user fees, which will have a huge impact on the livelihoods of waste pickers.
- With high levels of segregation, a smaller number of waste collectors operating with tempos or municipal services may be adequate if only dry waste is to be picked up. This will displace some members, and turn them into only 'sorters' employed by an 'agency' that picks up dry waste and may pay less for more work.
- Being employed (by a private agency) rather than

9. City Connect is a collaborative platform hosted by the Confederation of India Industry (CII). It is a model catalyzed by Business for Civil Society and Government to work together to make cities more livable. At the city level, it is envisaged that a core group of committed members from industry (4-7) set up a City Connect Foundation as a non-profit trust. These will be the founding trustees with statutory responsibilities. They are expected to have a long-term commitment to the idea and invite more partners in, to create a local-level collaborative group. This group is expected to take up work on themes relevant to the city, such as waste management, transportation, etc. For more information see http://cityconnect.in.

10. Barde, H, KKPKP, July 2018, personal communication

11. Swachhata mission initiatives in a timely and innovative manner. The Ministry of Urban Development, Government of India oversees the Swachh Survekshan in urban areas and the Quality Council of India carries out the assessment. In 2018, Pune ranked 10th in the country. For more information, see https://www.swachhsurvekshan2018.org/.

self-employed (as part of SWaCH) may lead to poorer work conditions for waste pickers, with employers who may impose exploitative remuneration, provide unsafe sorting areas, and cut corners on medical care and other necessary services.

- Private actors are already willing to purchase segregated recyclable waste even though such payment is not economically sustainable even in the near-term and at the city-scale. This can displace waste collectors, disrupt their service routine, and prevent their access to recyclables, especially high-value recyclable materials
- Fine sorting done by waste collectors, an essential step in the recycling chain, is not well-known or recognized by the public, while the next stage of aggregation of sorted recyclable materials is also in the informal economy. With loss of access to recyclables and user fees, it will be essential to develop mechanisms to account for and pay for this service.
- In the new model, an IEC strategy should develop the public understanding that sacking a waste collector is morally unacceptable; integration should be incentivized.
- Younger waste collectors may be trainable and may take up provision of composting services as an occupation, but it may be difficult for older persons.

Moving forward, the economics of compost services will need to be worked out, such as how much a waste picker will earn from user fees or from the sale of compost. Behavior change among stakeholders and the dynamics between waste generators, scrap traders, and other stakeholders in the economics of dry waste will need to be carefully monitored.

Waste collectors could potentially turn into compost unit workers. However, the experience of training waste collectors to operate compost units has been mixed. If scrap collection livelihoods are threatened, and compost operations emerges as a potential livelihood option, there may be better results with waste collector training and performance. This is possible but unclear so far. Some questions were raised, including:

- What will the earnings be?
- How will the logistics of this work, including the time spent per compost unit, the division of activities between collection of segregated waste and composting?
- Who will manage such a cadre of compost unit workers?

Should the New SWM Model be Implemented by a New Special Purpose Vehicle?

There was a strong feeling against setting up a new parastatal entity or an SPV.[12] This was perceived as being against the principle of democratic decentralization. Additionally, a state-level government resolution (GR) may be required if a new entity is to be established, as SWM is a core function of municipalities. Instead, many respondents felt that the goal should be to strengthen PMC, since SWM is the sovereign function of PMC. The following were suggested to strengthen the PMC SWM Department so that it can play a key role moving forward:

12. One example of an SPV set up for municipal solid waste management is the Goa Waste Management Corporation, created under the Goa Waste Management Corporation Act 2016. The purpose of the Corporation is for the "establishment and development of facilities for scientific management of various types of wastes". The Chief Minister is the Chairperson, with a Managing Director appointed by the State Government. There are no political representatives on the Board. The Corporation must carry out all directions provided by the State Government. In essence, it is an instrument completely controlled by the Chief Minister with acquisition of land and development for waste processing the primary concern of the Corporation. There is no mention of sustainable waste management, decentralization or integration of waste pickers in the Act.

- Identify staff within PMC and invest in their abilities, and recognize and reward their work.
- Create and hire for new positions during new recruitment at PMC.
- If new staff with specific expertise are hired, ensure they have the right attitude and abilities to facilitate decentralized SWM and composting.
- Ensure that the team assembled is not deployed in any other municipal function and is available as a dedicated resource to develop the new functions.
- Create and engage a citizens' group to monitor and support the PMC team. This may help to ensure that the team is able to dedicate its time to SWM.
- Involve the Garden Department in planning and operations, so that compost can be procured and used in municipal parks.

Rather than create a new entity, key informants were asked about using an existing SPV, such as the PSCDCL, as a platform to launch the proposed model. All state and local government officials interviewed felt that since the PSCDCL already exists, it would be appropriate to develop the concept and its operationalization in a limited area through the PSCDCL, perhaps with the eventual aim of transforming the SWM function and operations of the municipal corporation. The transition could be initiated through the PSCDCL and eventually implemented throughout the city by assisting the PMC.

Appointing Technical Experts

Regardless of whether the new model is developed through PMC or PSCDCL (or both), there was consensus that additional technical expertise would be needed. Options for bringing in and managing such expertise include:

- A City Connect kind of entity that identifies and taps into a city-wide network of managers.
- Strategically screened experts for orientation on SWM.
- Advisory positions that function independently while being accountable to the overall concept and integrated in the decision-making.
- Technical expertise in IEC and media strategy, operations planning, database management, and social welfare benefits and service delivery.

Operationalization

Various instruments to operationalize the model were suggested, including:

- Bylaws: State and national level officials supported the inclusion of a provision for mandatory *in situ* composting in bylaws, and felt it would be easy to accomplish.
- Incentives and Penalties:
  - Property tax: Provide rebates to those who compost and increase taxes of those who do not compost and provide unsegregated waste for collection.
  - Fines may be more effective than penalties.
  - Buy-back of compost can be a significant driver/incentive for residential societies to start composting; just like the property tax rebate is often an incentive, though the amount is quite small.
  - Subsidies, though two respondents felt they are not good drivers to sustain change. The subsidy amount is inadequate as a livelihood, difficult to obtain, and, when applicable, it is not clear who it accrues to.

- PMC should empanel and directly pay compost service providers per fixed rates.
- Niche marketing of compost, such as to the community of supporters of organic food and urban gardeners.
- Enrich and certify compost, and engage with farmers to sell compost, such as through the Harit brand being promoted by the Government of Maharashtra
- Authorization of Service Providers and Technologies
- It was suggested that when *in situ* composting becomes mandatory, there may be a spurt in service providers and some regulation of service providers and technologies would be useful. Suggestions include:
  - PMC / PSCDCL should create a technical approval process and after due diligence provide a list of compliant composting service providers for the benefit of the public, so that compost units are managed well.
  - Though they seem an attractive solution initially, electricity-based technologies (shredders, mixers etc) are not advisable as they are expensive, have high operating costs and failure rates, and could put the entire transition process at risk.
  - Any agency that provides waste collection services should be authorized and held accountable by PMC/ PSCDCL, else there is a possibility that they collect and dump.

Potential for Scale-up Beyond Pune

One official felt that it may be difficult to scale up the Pune model as other cities do not have waste collectors' collectives spearheaded by leadership which is regarded highly by all political parties, the administration and society in general. Other officials felt that the decentralized *in situ* composting model, once worked out, should be scaled up to other towns, including in PCMC, local bodies in the Pune metropolitan area, and smaller municipalities in Maharashtra.

Summary of Key Findings

The proposed model was met with general approval as having merit and being feasible to implement. Some of the reasons for this were:

- There is legal and judicial backing for this model
- There have been instances (even if not city-wide) where elements of the model have worked well
- The failure of components of the current model, in particular large centralized processing plants and increasing costs
- The increasing opposition to and non-availability of land for dumping
- The existing Pune model, and agreement between SWaCH and PMC in particular, were seen as necessary elements for the success of the proposed model, as well as a foundation to build on

Some recommendations to consider include:

- The need to change citizens' mindsets and engage them as partners
- The need to prevent political interference to ensure that the model can be effectively implemented and enforced
- The need for a carefully planned, phased approach

The idea of a completely new entity, namely a SWM SPV, did not find much favor. Generally, it was felt that despite its limitations, the urban local body (in this case, the PMC) should continue to be the entity to manage the city's waste. The political legitimacy that such a body possesses is important in a democracy and to ensure the ultimate success of the new model. The track record of various parastatal entities and SPVs has been mixed.[13] Those that have done well, such as the Metro Rail Corporation, have done so because of the focused nature of their area of work and independence from the day-to-day life and involvement of the citizen. SWM has a completely different nature and is not amenable to such an approach.

The transition from where the PMC Solid Waste Department is today to where it needs to be will be daunting and certain elements of a SPV could be helpful, namely reduced political interference when the model is still in its nascent phases, an SPV's ability to make quicker executive decisions, and its ability to hire specialized personnel and engage a range of partners across sectors to help develop and implement the model.

The Pune Smart City Development Corporation Ltd. (PSCDCL), created under the Smart Cities Mission,[14] could be a potential vehicle for the development and deployment of the SWM model in a limited geographical area ("the Smart City area") and to use the assets, experience and capacities developed in the process to scale the model – through the PMC – to the entire city.

Implications for Women's Livelihoods

One of the concerns that has motivated the exploration for an alternative model for SWM in Pune is the growing pressure on the Municipality to manage waste better in order to have a visibly clean city. The growth in the volume of waste generated in the city, citizen demand for a cleaner city (elimination of garbage heaps in the city), environmental litigation and court directives and the failure of existing systems have all led to growing interest in the exploration of private contracts for both waste collection and processing. Even though such systems are expected to be substantially more expensive, there is increasing political and bureaucratic interest in them, fueled in part by the availability of more innovative funding mechanisms and the lure of a hassle-free mechanism for solving the city's waste problems. Many cities in India are already looking at turnkey contracts that provide end-to-end waste management solutions. Such contracts are problematic in many ways, but primarily because they will lead to displacement of waste-pickers from SWM processes and also result in substantial reduction in their incomes. The increasing mechanization, reduction in material recovery (to favor waste-to-energy solutions) and removal of right to waste, are all likely to put pressure on the livelihoods of waste pickers.

13. For example, two respondents mentioned the lack of democratic accountability of parastatal entities and that of Delhi Jal Board; the authors' observations of the functioning of the Pune Mahanagar Parivahan Mahamandal Limited and the Metro Rail Corporation; and the report of the Working Group on Urban Governance for the 12th Five Year Plan (2012-2017), which states: "A common refrain in urban governance is the problem of fragmented and/or overlapping institutional responsibilities. Historically, due to poor staffing and technical capabilities of the Local Bodies, a number of Parastatal Bodies were created for providing services listed in the 12th Schedule. Consequently, a large number of parastatals, including Development Authorities, Water Supply & Sewerage Boards, Slum Housing & Development Boards, PWD, etc. have been performing various functions which could have been vested with the Local Bodies in accordance with the mandate of the 74th Amendment. The multiplicity of agencies providing various services in the Urban Sector has led to overlapping, ambiguity and wastage of resources. Over and above that, the parastatal bodies are not elected Bodies and are not directly answerable to the citizens."

14. For more information on the Smart Cities Mission, see: http://smartcities.gov.in/content/.

An alternative model with decentralized waste management at the center and an emphasis on material recovery that incorporates waste pickers into waste management processes is therefore seen as essential to protecting the livelihoods of waste pickers. It is recognized that even though such a system will create disruption of waste picker livelihoods (for example by potentially creating private sector interest in dry waste and increasing opposition to user fees - both of which are currently key components of the SWaCH model), with proper management and investment in re-skilling, one can still ensure that in the medium- to long-run, waste pickers will be better off. In short, the business as usual scenario for waste pickers could be very deleterious and warrants an intervention, wherein by identifying the potential impacts on waste pickers and devising appropriate mitigation measures, the well-being and security of livelihoods of waste pickers could be ensured.

Recommended SWM Model

Based on this study, an SWM model is proposed, with approach and governance elaborated, along with a proposed physical system and institutional structure and clear functions. The model includes a focus on worker protections, welfare and benefits, as well as on the engagement of civil society and the private sector as key partners. Finally, next steps are outlined.

Approach and Governance

Overall Approach

- The overall framework of waste management shall be long-term and sustainable, keeping in mind the growth of the city and solutions that are equitable and just for waste pickers and the public.
- Evaluation of options for handling, processing and disposing waste should primarily be based on environmental and social impacts, with economic aspects as a secondary objective and economic instruments designed to support environmental and social impacts.[15]
- The principles of 'cradle to cradle,' 'circular economy,' and extended producer responsibility (EPR) should be promoted (see Glossary for definitions).
- Complete cost analysis must be done when evaluating different options including not only direct costs, but also subsidies, rates of interest, buy-back arrangements, tipping fees, and provision of land and infrastructure.
- Poverty alleviation and employment generation are constitutional responsibilities of municipal corporations, so the inclusion of economically vulnerable segments of the population, especially informal waste pickers, that are dependent on solid waste for their livelihood, should be a policy objective, while ensuring that safe, decent and hygienic work conditions are mandatorily provided for all manual work performed in support of SWM.
- SWM should be comprehensive in scope and should look at all streams of waste and the entire process of waste management.
- 'Polluter pays' principle (see Glossary for definition) should be followed.

SWM Options

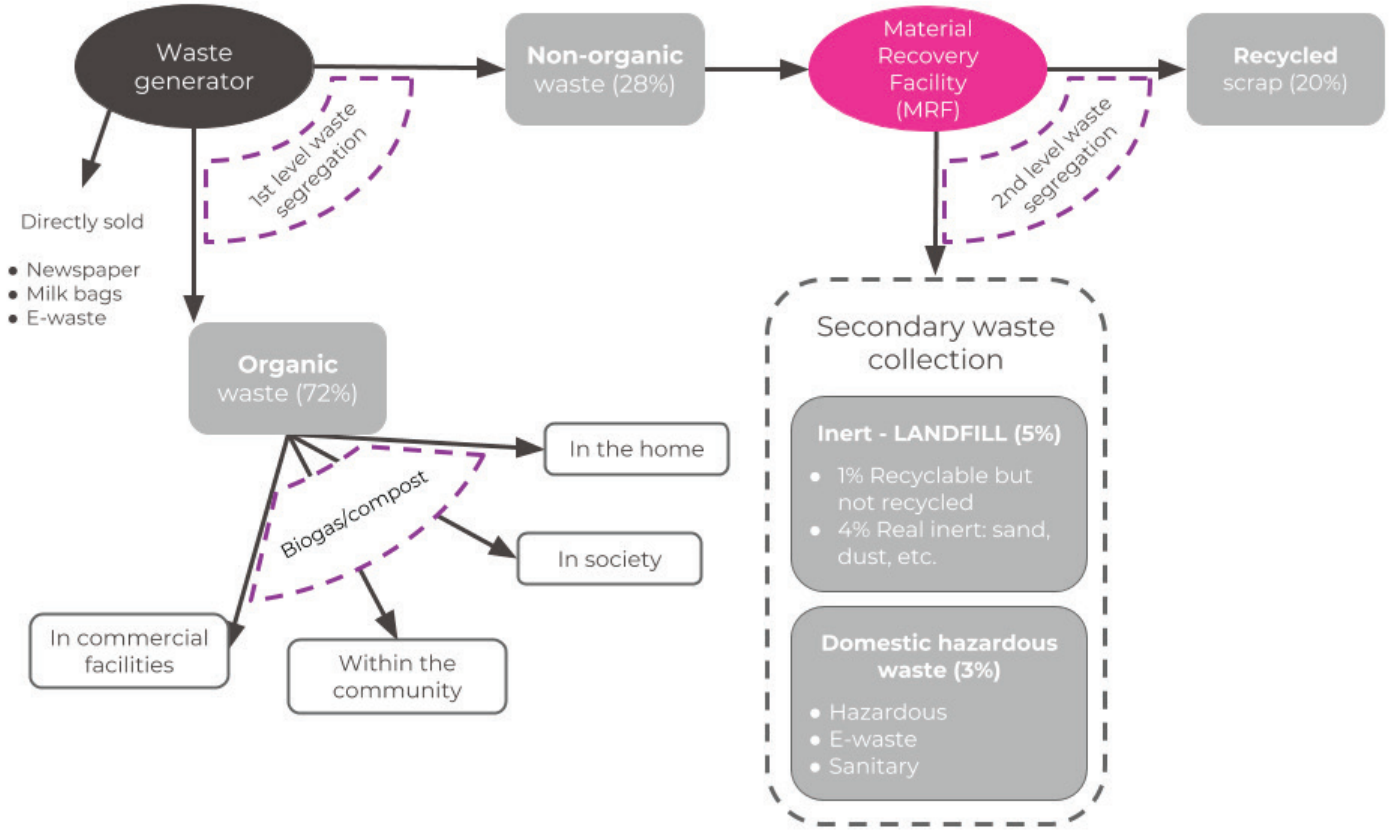
- Full acceptance of the 3R principle, i.e. maximization of reduction, re-utilization and recycling.
- Generators of SWM must share the responsibility for appropriately handling and disposing waste (already in the Maharashtra Municipal Corporations Act).
- Source segregation is a must since this enables more reuse, recovery and recycling options, reduces cost of operations, creates better work conditions for both formal and informal sanitation workers and enhances a sense of responsibility among waste generators.
- Decentralized recovery (diversion of waste for recycling) and processing options should be emphasized to the extent possible even if there is a slightly higher economic cost to doing so; one should reuse and recycle as close to source as possible; place for waste in the city must be allocated.
- Land-filling should be used sparingly and as a last resort.

Principles of Governance

- The Municipal Corporation is responsible for smooth and appropriate functioning of all aspects of SWM regardless of what functions it performs itself and what is chooses to outsource.
- Systems should be transparent and accountable.
- When implementing any plans or projects it should be in accordance with the policy and guiding principles as outlined above to ensure consistency.
- The waste management services provided to citizens should ensure there is equity of service to all, namely all sections of society – poor, middle

15. Environmental impact includes minimizing damage, including the ecological and carbon footprint. Social impacts include wellbeing of both citizens and SWM workers, employment, and worker safety.

Figure 2: Proposed Waste Flow Chart



Note: It is proposed that organic waste would be processed either at the individual household or society level, at the community level, and in facilities set up to service commercial establishments producing large quantities of organic waste, such as large hotels and restaurants.

and upper classes - using cross-subsidies where required.

- SWM is the joint responsibility of the citizen and the Municipal Corporation.

Proposed Physical System

The Proposed SWM Model

The current study examines a completely new model for SWM that represents a paradigm shift from the current collect-transport-process-landfill approach to one that seeks to manage waste by:

- Requiring complete decentralized processing of wet waste
- Maximizing recovery of dry waste for recycling
- Minimizing waste to landfill

This three-pronged approach to household waste also applies, with suitable changes, to other waste streams such as garden waste, construction and demolition waste, e-waste and biomedical waste.

For household waste, the focus would therefore be on:

- Composting of wet waste at the household, society or community level depending on the local context
- Fine segregation and aggregation of dry waste at the community level at sorting sites or material recovery facilities (MRFs)[16] by waste pickers
- Elimination of products that are not recyclable or increasing viability for recycling materials to reduce waste to landfill, through strategies such as introducing a procurement price or buy-back of materials that would not otherwise be picked up by waste pickers.

Segregation at Waste Generator Level

Considering the current proportion of wastes (see Box 1), the physical system of waste management should aim to ensure that:

- Each generator separates waste into four categories at the household-level: organic waste, recyclable waste, sanitary waste and inert materials
- Organic waste, if not composted at the household-level, is kept in a separate container which is not a plastic bag
- Non-organic waste should be segregated in a separate, marked bag or container with domestic sanitary waste and a separate bag or container with domestic hazardous and e-wastes

Processing of Organic Waste

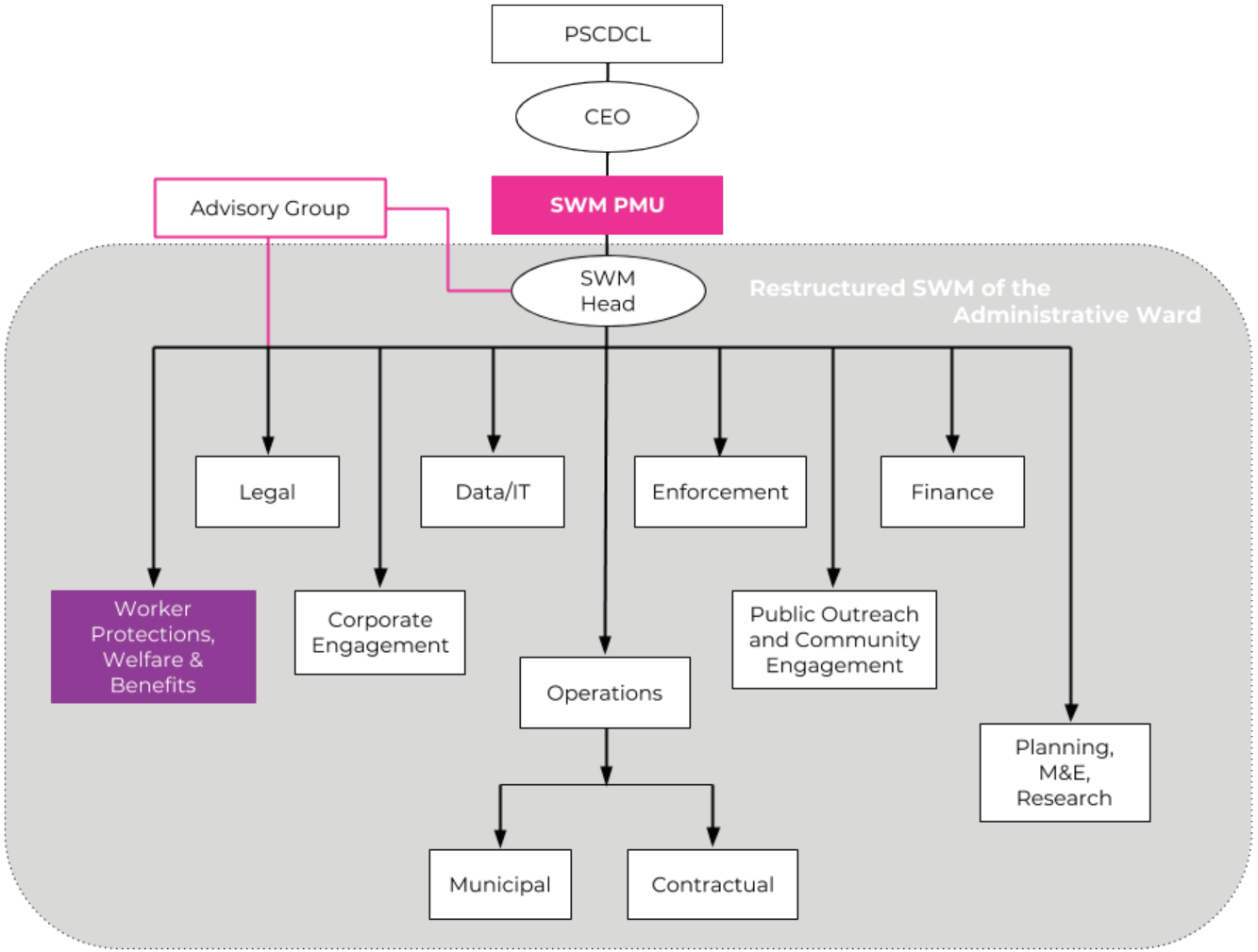
Organic waste is to be composted or converted to biogas at the household, society, community or neighborhood level.

Handling and Processing of Non-Organic Waste

Non-organic waste would be transported to the nearest 'sorting site' or MRF by the waste collectors. These MRFs may be of different sizes depending on the availability of space and may have different levels of facilities for waste sorting, aggregation and temporary storage, packaging and transportation. Non-recyclable materials would also be aggregated at MRFs for secondary collection and ultimate transportation to appropriate sites for further processing or deposition in the landfill.

16. The material recovery facilities or MRFs are envisaged as well-managed sites, with safe work conditions, where fine sorting of recyclables can take place. Some will have drinking water and toilets. SWaCH is currently working with the PMC, a private sector philanthropist and architects providing pro-bono services to repair and build new MRFs across all wards of Pune City.

Figure 3: Proposed SWM Project Management Unit Structure in the Smart City Corporation



Recommended Institutional Structure

The SWM Entity Under the Smart City Corporation

The current SWM Department of the PMC would have to be fundamentally re-constituted to be able to plan and execute the proposed SWM model. The SWM Department of the PMC is headed by a Joint Municipal Commissioner and has the largest number of staff among the various line departments in the institution. The urban area governed by PMC is divided into 15 Administrative Wards, each headed by an Assistant Municipal Commissioner, with an SWM sub-department attached to it.

In contrast, the Smart City Corporation (PSCDCL) is a lean entity. It is tasked with the implementation of the Smart City Proposal, with certain projects – including SWM - to be implemented within the Smart City area, which more or less covers one administrative ward, while others (mainly IT-related) are to be implemented at the pan-city level. There is an earmarked budget of about INR 37 crores for SWM, including capital and operational expenditure, for about three years. Part of the revenue is to be raised from user fees. While the proposed Smart City SWM solutions were to be completed by 2018, so far there has been not much progress. The PSCDCL works with a staff of about 22 persons, 10 of whom belong to a single general management consultant firm that helps develop various contracts executed by the PSCDCL.

It is expected that the PSCDCL will implement the SWM model using the municipal machinery. The municipal staff does not currently report to the CEO of the PSCDCL. This will be a major challenge for the implementation of the project (any project for that matter, but more so in the case of SWM), but this reporting line issue will have to be resolved for the model to work.

It is within this context that the structure for implementation of the new SWM model within the PSCDCL is proposed, with the following key features:

- The SWM model will be managed by a Project Management Unit (PMU).
- The SWM PMU will be headed by an Assistant Commissioner; a senior-level administrative officer with experience in general administration or SWM.
- The PMC SWM department at the Aundh Ward[17]-level will be re-structured, with functional leads (see Figure 3) selected from existing staff with the potential to take up the new positions, or new hires, with a view to transitioning them to become full-fledged municipal staff in the future; existing municipal staff to be enlisted for this entity would be those with the potential and willingness to adopt a new style of working.
- The SWM PMU shall be supported and mentored by an advisory group consisting of people with the skills and experience to help build up the new PMU, including representatives from collective action platforms of waste pickers, civil society, the corporate sector, and hired experts. Advisory group members will support the SWM Head and support and mentor each of the functional leads.
- The new SWM entity would be able to hire people to fill new functional positions, with the intent for them to be eventually absorbed into the Municipal system.

17. The administrative ward that roughly covers the same area as Smart City

Functions of the Proposed SWM Model

Planning (annual, mid and long-term)

- Set service levels for collection, storage, transport, processing of household and other waste streams
- Ensure systems sizing
- Monitoring and evaluation (M&E) and reviews
- Financial planning – revenue streams for capital investments, operations, innovations/ projects, determine user fees

Operations

- Meeting agreed service levels
- Door-to-door SWM collection by waste pickers
- Separate systems for bulk waste and various streams
- Street sweeping
- Mechanisms to facilitate *in situ*/decentralized composting
- Mechanisms to facilitate materials recovery
- Mechanisms to handle different streams of waste: biomedical, e-waste, construction and demolition (C&D), hotel, garden, street sweeping, etc.
- Secondary operations and landfill management
- IEC strategy development and implementation, citizens' engagement, engagement with elected representatives, setting up mechanisms for public participation
- Maintenance of equipment and facilities
- Grievance redress

Enforcement and Penalties Management

- Public penalties on those who do not segregate, or violate littering and burning guidelines
- Clearances and reporting to Maharashtra Pollution Control Board (MPCB) and other relevant authorities

Contracts management to devise new contract documents, undertake contracting processes, ensure terms of contract are met; grievance redress

Human Resources and Workers' Welfare, with a focus on the integration of waste pickers and benefits for waste pickers and other waste workers. See below for more details.

Partnerships management, including private sector engagement and corporate social responsibility (CSR) and citizen engagement. See below for more details.

Studies and Innovation

- Studies on issues including waste volume, characterization, flows, existing resources of composting, recycling, processing, equipment, staff, mapping all types of waste generators and service levels, amenity spaces available and potential for SWM, and citizen perceptions and satisfaction with current systems
- Research
- Reporting
- How to handle Extended Producer Responsibility (EPR)
- Ongoing evaluation/assessment of the model to build in ongoing checks and balances

Worker Protections, Welfare and Benefits

While it is recognized that waste pickers must be integrated into the formal SWM system[18] under the SWM Rules, 2016[19] of the Ministry of Environment, Forest and Climate Change, there is still no explicit recognition of waste pickers and all the other workers in this sector.

It is proposed that the new SWM entity be established with an explicit recognition that waste pickers and other workers working with waste, such as itinerant buyers and scrap store workers, must be fully integrated and recognized as "workers" (even if they are not formally employed by the Municipal entity). They should therefore be eligible for various benefits that workers are entitled to.

Under the proposed SWM entity, waste pickers would be recognized as workers and the SWM entity will have the mandate/obligation to ensure that their work conditions are decent, based on the parameters of decent work set out by the International Labour Organisation. They may be accorded equal status as the quality of service level benchmarks.

This is to be achieved by:

- Identifying and registering waste pickers willing to sign in to the formalized door-to-door collection systems of SWM.
- Ensuring that each waste picker has a photo-identity card that duly authorizes her to carry out her work of door-to-door waste collection and categorization of materials without hindrance or interference.
- Ensuring that the earnings of waste pickers from collection fees and sale of materials compare favorably with the prescribed minimum wage for this work.
- Ensuring access to user-friendly and ergonomically-designed collection equipment that takes into account occupational safety and hygiene requirements.
- Ensuring access to well-ventilated workspaces for categorization and storage of recyclable materials.
- Ensuring access to opportunities to upskill and progress professionally within the system, including for waste pickers to shift into other waste related activities and facilitating that transition into activities such as pre-processing of dry waste, transport/logistics, and operating scrap shops.
- Direct provision of benefits, some of which are already available, including non-contributory outpatient and inpatient personal medical coverage; life and disability insurance; accident insurance; cash child care support for up to two children so that the worker may use creche facilities of her choice; and co-contribution towards the government pension fund.
- Ensuring that the occupational identity card enables access to generic public welfare programs, benefits and entitlements from the government, including, but not limited to, general insurance, good quality health services, scholarships and other education benefits for children, credit, housing, and safe public transportation.

18. The SWM Rules 2016 provide the statutory framework under which solid waste management must happen in the country and are notified under the Environment Protection Act. They specify:

Under duties of the State: *State policies and strategies should acknowledge the primary role played by the informal sector of waste pickers, waste collectors and recycling industry in reducing waste and provide broad guidelines regarding integration of waste picker or informal waste collectors in the waste management system.*

Under duties of the local authorities: *Establish a system to recognise organisations of waste pickers or informal waste collectors and promote and establish a system for integration of these authorised waste-pickers and waste collectors to facilitate their participation in solid waste management including door to door collection of waste.*

19. http://www.moef.nic.in/sites/default/files/SWM%202016_0.pdf

Barriers to Access[20]

Currently, benefits are not disbursed to the waste pickers directly by the SWM Department of the PMC, and instead must be accessed from each entity providing the benefits. This has severely limited their accessibility. Interventions by the waste pickers trade union KKPKP and SWaCH have led to waste pickers receiving at least some benefits. Without this intervention, almost no benefits would have been received. Each type of benefit has significant barriers to access, and there is no coordination to streamline processes so that waste pickers can access benefits under different schemes.

The barriers to access are:

- Means tested and targeted entitlements
- Lack of awareness among waste pickers of existing benefits and entitlements
- Multiple points of service and multiple service provision entities
- Reluctance to provide the benefits at the point of service
- Enrollment processes that are designed for exclusion
- Budgetary constraints and quotas for beneficiary entitlements
- Absence of grievance redress measures and user based social audits
- A tedious and ill-defined authentication process for beneficiary identification
- Inconsistent eligibility requirements (e.g. below poverty line (BPL) changes for different benefits)
- Convoluted and tedious paperwork that often leads to large-scale exclusion
- Lengthy processes that lead to delays in receiving benefits even when they are received

Proposed Reforms to Improve Access to Welfare Benefits for Waste Workers

It is proposed that the new SWM entity shall have a specific 'Waste Pickers and other Informal Sector Waste Workers Welfare and Benefits' vertical.
Several levels of interventions are proposed:

- Adequate, committed and earmarked fund allocations as a proportion of the total SWM budget similar to how government makes provisions for salaries of government officials.
- Information technology (IT) innovations that allow faster processing of benefits, such as the creation of a database of the workers along with documentation linked to the Aadhaar card and system.
- Development of smart ID cards for workers that reduce paperwork and allow for real-time updating of information.
- Consolidation of various benefits for which waste pickers (and other workers) are eligible under the SWM entity by creating a single-window for the disbursal of these benefits within the entity. This could begin by consolidation of city-level benefits and then State- and Center-level benefits.

A more structured approach is also proposed for the maintenance and authentication of workers involved in waste management by the creation of a 'Convergent Welfare and Benefits Panel' which will allow any waste worker, engaged by any of the service providers (the doorstep collection service, the dry waste processing services, composting and other wet-waste processing services) to register themselves as legitimate workers in the sector.

20. The 3D Program is currently working with SNDT University to conduct a mapping of the current scenario, with a focus on mapping the range of existing health, education and financial inclusion schemes and benefits available to waste pickers, understanding and addressing the barriers to access, and identifying and filling gaps.

The Convergent Welfare and Benefits Panel should graduate to being able to administer a 'Convergent Welfare and Benefits Fund', envisaged as a consolidated fund created from the various moneys allocated under various welfare and benefits schemes. The panel should also make efforts to raise funds from corporates to be able to provide benefits beyond those that are established by the government.

Work Conditions

The Workers' Welfare and Benefits vertical would also ensure safe work conditions, including:

- Well-built and maintained sorting spaces and MRFs designed as per standards (to be developed) to ensure proper ventilation, protection from the elements, lighting and access to drinking water and toilets
- Provision of appropriate equipment and personal protective gear
- Service levels to include weekly time off
- Management protocols to include provisions for worker substitution to account for leave, such as personal, medical and maternity leave
- Complaint and redress mechanisms

Partnerships with Civil Society and the Private Sector

Building the capacity of the public SWM entity to manage waste in the new paradigm is a key objective of the proposed structure. Often, engagement of consultants or execution of contracts by private companies does not necessarily translate into any capacity-building of core municipal staff or reform of its processes. Most reform is either driven by civil society[21] or mandated by the State/Central Government.[22] Civil society – both waste pickers collectives and other organizations, as well as citizens themselves - can provide important inputs and momentum. Additionally, the private sector can either be engaged as a competitor or leveraged as a partner.

It is therefore essential that civil society organizations, including workers' collective action platforms and citizens groups, continue to play a strong role in shaping the SWM entity, its structure and its processes, by having an opportunity for continual and institutionalized engagement; and the resources of the corporate sector are leveraged, by enlisting their support for specialized management functions, planning, logistics, financing and skill enhancement.

Civil Society and Citizen Engagement

Building on the strengths of the current model, and to safe guard the livelihoods of waste pickers, waste picker collectives and their advocates should be engaged in both the design and the implementation of the proposed model.

Additionally, the active participation of citizens is the fundamental basis on which the proposed SWM model is built. Comprehensive IEC and the inclusion of civil society organizations (CSOs) in the institutional structure is critical to the success of the model. Citizens are required to be active partners in the management of waste, with the city enabling this by providing information in various formats and creating fora at every level (neighborhood, community, ward) for the exchange of information and development and review of plans. Citizens (individually or collectively) are expected to interact with the SWM service

21. Such as the creation of SWaCH

22. Examples include the Solid Waste Management Rules published by the Government of India or requirements under the Jawaharlal Nehru National Urban Renewal Mission (JnNURM)

providers, SWaCH. They are not expected to be passive "consumers" of a "service" and the relationship between citizens and the city is not defined in the narrow sense of a "service provider" and "consumer". While a consumer grievance redress system may continue to exist, it is not expected to be the sole, or even the most important, platform for citizen engagement. By extension, the city councillor is expected to play the role of facilitator and enable the success of the model by ensuring meaningful engagement between citizens, SWaCH and the city SWM staff and officials.

To meet these objectives Ward SWM Committees are proposed with representation from all key stakeholders, including the:

- Corporator – chairperson of the committee
- Ward-level official – secretary
- Citizen groups
- SWaCH ward representative
- SWM city staff and other informal workers (such as scrap shop owners, MRF operators, etc.)
- Other organization representatives such as from educational and other institutions, shopkeepers, street vendors, etc.

The committee is expected to review and recommend actions on various SWM issues such as:

- Segregation
- Ratings and audits
- Collection
- Dumping, littering, bans
- Street sweeping
- Outreach
- Complaints review (for both citizen and service provider)
- Report to City SWM Committee

A similar structure is proposed at the Smart City level. The non-official SWM ward committee members may have a fixed term, and will be responsible for conducting, through trained facilitators, public dialogue in which people from different walks of life can participate in SWM governance and reviews and provide different perspectives.

For this, the new SWM entity would have to enhance its capacity for setting up comprehensive IEC processes as an integral element of its operations, including developing communications and media strategies, preparing information materials, setting up communication channels and assets, and have in place a policy on public engagement and a team of facilitators to mediate public dialogue. The entity would also have to start engaging with the public early on, as part of establishing the entity and developing its methods of operations, not as an add-on 'promotions and outreach' function.

Private Sector Involvement

It is recommended that the new SWM Entity have strong linkages to the private sector to leverage the technical and financial resources it has to offer. Broadly, the support will come either as part of corporate social responsibility (CSR) initiatives or under the sector's statutory role as part of the EPR.

CSR contributions can be used to:

- Augment funds for the welfare of informal sector workers engaged in SWM
- Provide technical expertise for capacity building

(technology, management, legal, logistics, etc.) directly or by supporting the engagement of staff with those skills

- Support innovation and pilot testing of new technologies before they are adopted and taken to scale
- Support services provided by the SWM entity as part of its overall plan and objectives, as opposed to providing parallel services
- Invest in infrastructure and equipment

Under the Solid Waste, Plastic Waste and E-waste Management Rules of 2016, the producer of certain types of products and packaging is responsible for the end of life of the product and packaging manufactured. In order to fulfill those requirements, the producer (either individually or collectively, or by supporting the local authority) must ensure systems for collection and processing of those products are put in place.

Vigorous pursuance of EPR requirements in the law by the SWM PMU under the Corporate Engagement vertical is proposed.

Next Steps

To operationalize the suggested model within PSCDCL the following steps are suggested:

Immediate

- Present the overall findings and conclusions of this report to and validate the feasibility of the approach with key decision-makers, with a focus on State, Municipal and Smart City Corporation officials.
- Initiate more detailed discussions with the PSCDCL CEO and his advisory staff with regards to formalizing the decision to implement the model. This may entail a formal resolution being moved to this effect by the Board of Directors of PSCDCL.
- Formalize an agreement between the PSCDCL and the 3D Program for Girls and Women to develop a detailed project plan for the adoption and execution of the model.
- Create an advisory group to help finalize the project plan.

Mid-term

- Create a core multi-stakeholder team to start establishing the institutional structures to execute the project plan.
- Plan the re-structuring of PMC SWM staff at the ward-level.
- Ramp up staffing as well as filling of advisory and special function roles.
- Execute the project plan.
- Undertake periodic reviews and course corrections as needed.

Long-term

- Start planning the transition/adoption of the model at the city-level.
- Guide the transition.
- Develop PSCDCL as the incubation center for continued innovation and improvements and as a technical wing of the PMC.
- Continue monitoring, evaluation and refinement of the SWM model.

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Appendices

Appendix 1: Glossary

Circular Economy

A circular economy is an alternative to a traditional linear economy (make, use, dispose) in which resources are kept in use for as long as possible, the maximum value is extracted from them whilst in use, and products and materials are recovered and regenerated at the end of each service life.[23] This is a regenerative system in which goods are turned into resources at the end of their lives, and the materials loops in industrial ecosystems are closed, resulting in the minimizing of waste. It involves repairing, recycling and reusing goods and replaces production with sufficiency, thereby creating a low carbon economy. This system has models that are both economically and environmentally sustainable (Stahel 2016).

Cradle to Cradle

Cradle to cradle is a design framework in which products have a positive relationship with ecological health as well as abundance with long-term economic growth (Braungart, McDonough and Bollinger 2007). The entire product becomes sustainable and there is no accumulation of waste (Sherratt 2013). Products can be completely upcycled and become part of nature's processes, that is become biodegradable, nutrients or minerals. In the cradle to cradle model, all materials used in industrial or commercial processes, such as metals, fibers, dyes, fall into one of two categories:

- Technical nutrients are strictly limited to non-toxic, non-harmful synthetic materials that have no negative effects on the natural environment. They can be used in continuous cycles as the same product without losing their integrity or quality, can be used over and over again instead of being "downcycled" into lesser products, and ultimately become waste.
- Biological Nutrients are organic materials that, once used, can be disposed of in any natural environment and decompose into the soil, providing food for small life forms without affecting the natural environment. This is dependent on the ecology of the region. For example, organic material from one country or landmass may be harmful to the ecology of another country or landmass.[24]

Extended Producer Responsibility

Extended producer responsibility (EPR) Is defined in the Solid, Plastic and E-waste Management Rules 2016 to mean responsibility of any producer of packaging products such as plastic, tin, glass and corrugated boxes, e-waste, etc., for environmentally sound management, until the end of its life. EPR may comprise of implementing a take back system or establishing collection centers or both and having agreements in place with authorized dismantlers or recyclers, either individually or collectively. The Solid Waste Management Rules of 2016 also mandate that producers of these materials provide the required financial assistance to local authorities to establish waste management systems (Ministry of Environment, Forest and Climate Change 2016).

Material Recovery Facility (MRF)

A facility where non-compostable solid waste can be temporarily stored to facilitate segregation, sorting and recovery of recyclables from various components of waste by an authorized informal sector of waste pickers, informal recyclers or any other work force engaged by the local body or entity before the waste is delivered or collected for processing or disposal (SWM Rules 2016).

23. For more information, see http://www.wrap.org.uk/about-us/about/wrap-and-circular-economy

24. For more information, see http://www.mcdonough.com/cradle-to-cradle/

Polluter Pays Principle

Principle 16 of the Rio Declaration of Environment and Development 1992 states that: "National authorities should endeavor to promote the internalization of environmental costs and the use of economic instruments, taking into account the approach that the polluter should, in principle, bear the cost of pollution, with due regard to the public interest and without distorting international trade and investment." This has become part of the law of the land by way of judicial precedent in judgments related to the National Green Tribunal (NGT) Act 2010 of the Parliament of India which specifies that "The Tribunal shall, while passing any order or decision or award, apply the principles of sustainable development, the precautionary principle and the polluter pays principle".

Waste Generator

Waste generator includes every citizen or group of citizens, and every residential premise and non-residential establishment which generates solid waste, including public or private sector companies, hospitals, schools, colleges, universities and other education institutions, organizations, academies, hotels, restaurants, malls and shopping complexes.

Appendix 2: Terms of Reference

Scope

The scope of this study was to arrive at a robust alternative structure that enables the seamless functioning of the Solid Waste Management (SWM) responsibility of the Pune Municipal Corporation, in an environmentally sustainable, socially inclusive, participatory, decentralized and economically efficient manner.

Deliverables

The output will be a report that uses evidence to recommend the best public-private financing, governance and implementation structure and procedures to address solid waste management in Pune City in an environmentally sustainable, socially inclusive, participatory, decentralized and economically efficient manner.

The report will include:

- Outlining detailed plans for collection, storage, processing of segregated streams of Municipal Waste
- Recommendations of appropriate bylaws and a policy framework for SWM
- Developing an appropriate structure and set of procedures for the seamless public and private financing and implementation of the various functions of SWM
- Proposing strong public-private governance models that include robust feedback and monitoring mechanisms to ensure transparency and accountability of the above

Tasks

- Studying and analyzing SWM structures within and outside India
- Interviewing senior bureaucrats, current, and former municipal commissioners and SWM department staff
- Consulting experts in finance, policy, governance and municipal structures
- Consulting private sector players in the field of SWM, including philanthropic initiatives and waste management companies
- Interviewing Municipal staff and workers to understand their functioning, limitations and barriers of existing systems and structures for SWM
- Understanding the functioning, limitations and barriers faced by informal sector workers in SWM
- Conducting a desk review and field study of the structure, financing, functioning and impact of existing Special Purpose Vehicles (SPVs) in urban settings in India to assess the suitability of an SPV as an institutional mechanism for addressing SWM in Pune city
- Organizing stakeholder consultations, including one-on-one meetings; small group meetings; and stakeholder workshops, to seek inputs on the proposed structures
- Linking with ongoing efforts to assess the potential for convergence of social welfare benefits and protections to waste pickers through the SWM model

Appendix 3: Key Informants

(Listed in alphabetical order)

Interviews were conducted between December 2017 – June 2018.

Harshad Barde, General Secretary, Kagad Kach Patra Kashtakari Panchayat (KKPKP)

Bharati Chaturvedi, Founder and Director, Chintan Environmental Research and Action Group

Poornima Chikarmane, Associate Professor, Department of Continuing & Adult Education & Extension Work, SNDT Women's University

Prerna Deshbhrathar, India Administrative Service (IAS), Additional Municipal Commissioner, Pune Municipal Corporation

Shubhagato Dasgupta, Senior Fellow, Centre for Policy Research

Anil Gokarn, Business Partner, Institute of Natural Organic Agriculture (INORA)

Madhav Jagtap, Deputy Commissioner, Pune Municipal Corporation

Suresh Jagtap, Assistant Municipal Commissioner (Solid Waste Management Department), Pune Municipal Corporation

Vinod Kumar Jindal, India Cost Accounts Services, Mission Director – Swachh Bharat Mission (Urban)

Priyadarshini Karve, Director, Samuchit Enviro Tech

Nitin Kareer, IAS, Principal Secretary, Urban Development Department, Government of Maharashtra

Manisha Mhaiskar, IAS, Principal Secretary, Urban Development Department, Government of Maharashtra

Praveen Pardeshi, IAS, Additional Chief Secretary, Chief Minister's Office, Government of Maharashtra

Jagan Shah, Director, National Institute of Urban Affairs

Aparna Susarla, Manager, Solid Waste Collection and Handling (SWaCH)

Manjushree Tadvalkar, Managing Director, Institute of Natural Organic Agriculture (INORA)

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International Center for Research on Women (ICRW)

Pune Zilla Parishad • Mahila Sarvangeen Utkarsh Mandal (MASUM)

Gokhale Institute of Politics & Economics • Pune Municipal Corporation

Kagad Kach Patra Kashtakari Panchayat (KKPKP) • SWaCH

Pune Smart City Development Corporation, Limited

Centre for Environment Education (CEE) • SAMYAK

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