

ENVIRONMENTAL PRESSURE GROUPS TOWARDS IMPROVING WASTE MANAGEMENT IN CITIES A STUDY BENGALURU

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ABSTRACT

Rapid urbanisation has affected urban environs in several ways besides posing staid challenges of various forms. Varied reasons include increased migration, high population growth, consumerism, life style change, all affecting governance. Waste generation is one such outcome that has become a burden in cities affecting aesthetics, health, environment and others. In addition to the obvious approaches of composting, landfill, basic recycling and reuse, many innovative approaches/initiatives to waste management are seen in city contexts, specifically, with stakeholder participation across phases of segregation, collection, transportation, disposal and treatment, in addition to awareness creation. All of it, acting as pressure groups for improving governance and demanding for improved efficiency in waste management. This has been witnessed extensively in Bengaluru city where we witness plog runs, compost *santhe*, zero-waste events & weddings, composting, recycling and events promoting eco-friendly products, green entrepreneurs and others widely publicised through radio, television, banners and posters at public places and also through social media platforms like Whatsapp groups, Facebook and Twitter handles. Citizen networks although in isolated ways and minuscule forms, a multitude of them will bring about transformations at city contexts. This paper is a diffident effort to understand and map the initiatives across the city of Bengaluru. These initiatives have been classified and discussed. Secondary data sources and some primary field observations have been used. We find that stakeholder engagement and initiatives have largely been undertaken under awareness creation and waste collection and segregation.

Key words: Waste Management, Solid Waste, Urban Pollution, Civic activism

INTRODUCTION

Urban centers or cities are the focal points of human civilization. Rapid urbanization has made its impact on the vulnerable ecology of the globe causing pollution of various forms. Unplanned cities protrude as eyesores with poor sanitation. Environmental quality has thus become a scarce good. The ecological challenge that the urban society is facing is not only a question of appropriate technology and the right infrastructure but also a question of life styles and social values. The major force for the protection of the environment today is the modern conservation movement, a loosely organized number of individuals and organizations dedicated to the preservation of environmental quality. As viewed by J.H. Dales (1968) most

environmental problems in the present context is linked to the waste disposal costs associated with high levels of production and consumption.

Solid Waste pollution is one of the outcomes of rapid urbanization. This modern world functions as a throw-away society. According the Circular Economy report (2021) by Ministry of MoHUA (Ministry of Housing and Urban Affairs) an estimated 55 million tones of municipal waste is generated by 377 million urban citizens annually. About 75,000 TPD (Tones Per Day) of wet waste is generated daily and under Swachh Bharat Mission (Urban) only 68 % of it is processed. Under dry waste, plastic is the major component and out of 26,000 TPD plastic waste generated only 15,600 TPD is recycled while 9,400 TPD is left uncollected or littered. According to the 2015-16 report of standing committee on energy (Ministry of New and Renewable Energy) the total generation of MSW is projected to reach 165 million tonnes by 2031 due to increased urbanisation, industrialisation and changing life patterns. The report also highlighted the grams per capita for large cities, medium cities and small cities as 400-600 grams, 300-400 grams and 200-300 grams respectively. Majority of the waste produced in India is compostable in nature. A study, done by Centre For Pollution Control Board with NEERI (National Environmental Engineering Institute, Nagpur) in 59 cities, reported compostable waste constituting more than 50% of the total MSW.

The challenge to handle waste is growing enormously and the solution is not just reducing, reusing, recycling and composting, but also a complete re-education of how we live. Uncollected solid waste is a public nuisance. The social aspects of MSWM (Municipal Solid Waste Management) includes the patterns of various kinds of materials used by the society, the amount of waste generated and the various ways by which that waste is disposed, their interest in waste reduction and minimisation and the degree to which they segregate different kinds of waste. People's attitude influences the extent and type of waste collection and disposal techniques undertaken by the concerned authorities (Schubeler, 1996). Thus, people, communities, micro-and small enterprises, waste pickers, itinerant waste buyers, NGOs (Muller and Hoffinan 2001) play a critical role in efficient management of waste. Dependence alone on technical and financial support for efficient waste management while ignoring the 'human factor' is not sufficient. Approach should be focused on relationships between people and government (Ahmed and Ali 2006). Thus, all these studies have stressed on the role of people for improving waste management and our paper stresses on these loosely organised, yet powerful initiatives that have led to transformations in the city.

With increased urbanization, Bengaluru is struggling with population increase, infrastructure bottlenecks, migration of working population towards the city. With the population of 10,207,063 (BDA Master Plan 2031) the city of Bengaluru generates 5,758 tonnes of MSW daily, which includes 64% of wet waste, 28% of dry waste, 6% inert waste and 3% of domestic hazardous waste. The waste generation in BBMP area amounts to 564 grams per capita per day (BBMP SWM manual 2017). As per BBMP (2017) the indicative composition of waste includes 30% of vegetable waste followed by 23% of organic. Plastic amounts to 12% while electronic and bio-medical waste accounts for 2%.

Bengaluru is the most urbanised district of all the districts in Karnataka with 90.94 per cent of its population residing in urban areas putting immense pressure on the delivery of civic services. However, in recent times the city has witnessed cluster of moments which involve

active participation of stakeholders, increase in awareness level of citizens, formation of multiple citizens groups, usage of social media platforms viz. Whatsapp groups, Facebook and Twitter etc. to address grievances and introduce accountability with respect to various civic services, influencing governance. A variety of initiatives, ranging from awareness campaigns, rally to segregation, composting, up-cycling/recycling, compost santhe, drive against plastic, cutlery banks are catching up in the city to promote sustainable waste management. The city has witnessed active participation from different stakeholders like Non-Governmental Organisations (NGOs), Self-Help Groups (SHGs), Green Entrepreneurs, Itinerant buyers, citizens and the municipal corporation. Several citizens network have come into existence in the city which are actively engaged in various civic issues ranging from solid waste management to wildlife conservation, zoning and land use regulations, traffic and safety concerns, roads and infrastructure development etc. These citizens' networks have initiated the urban environment stewardship and are strong advocates of transparency and democratic conduct. Keeping in mind the accountability these networks bring into the administration, the role of the citizens in governance is a potential area to be explored. (Enqvist et al 2014). These social relationships have helped people to act efficiently (Coleman 1988). One interesting observation is that these groups are using technology, especially social media, to increase their reach and are also ever expanding. On similar lines, a report by UN Habitat (2010) stressed on the role of stakeholders and mentioned them as one of the three dimensions of Integrated Waste Management for an efficient solid waste management system.

Enqvist et al (2014), makes an attempt to describe a citizen network engaged in environmental issues in Bangalore, India, where rapid urbanisation puts pressure on conventional management structures as well as the ecosystems providing benefits for the city's inhabitants. The study uses a mixed method approach of qualitative interviews and social network analysis. The main findings of the paper illustrate that the citizen network functions as a platform that enables interaction between diverse interest groups, and as a watchdog that monitors parks, lakes and trees to prevent further loss of fragmented urban ecosystems. Authors also emphasize that this is important for monitoring Bangalore's fragmented ecosystems and for raising public awareness and support. Finally, the study highlights an urgent need to develop a comprehensive framework for urban environmental stewardship, to better describe potential roles of citizens in governance across diverse social, political and ecological conditions, and during different periods of urban change.

Initiatives in waste management can also be classified into various categories ranging from legal framework, which includes several Constitutional, environmental and pollution Acts, to policy initiatives like National Sanitation Policy, 2008 to Ecomark Scheme, 1991. Another category of classification of initiatives can be key government programmes like JNNURM, Total Sanitation Campaign, etc. (Agarwal *et al* 2015). However, public awareness and participation is seen as a major tool in the success of waste management (Hasan 2004) as they will bring accountability to the waste management system (Ahmed & Ali 2006).

In today's times, India is witnessing a very crucial stage where there is a lot of focus on governance through local self-government and at the same time urbanisation is showing

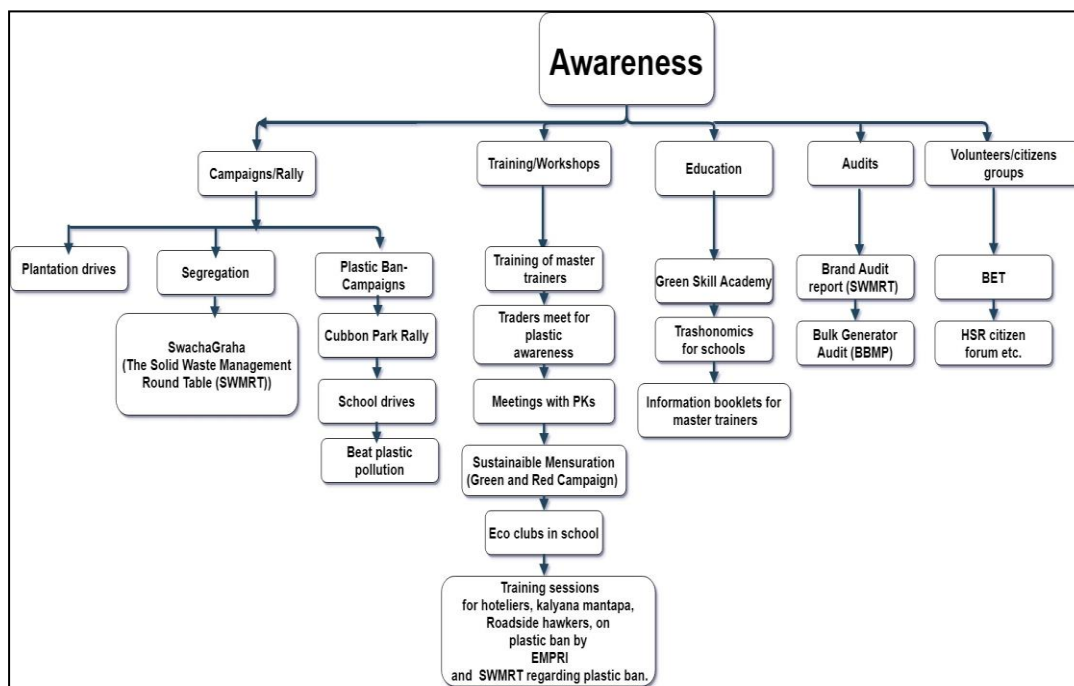
astonishing trends. At this point, tapping the potential of increasing citizen's networks for delivery of municipal services can be a promising platform.

In this paper, we document several initiatives taken up in Bengaluru city, by various groups like the civil society organizations, non-governmental organizations in collaboration with the BBMP and independently, which are working towards improving solid waste management. Through this, it can be inferred that pressure groups play an important role in improving governance and facilitating improvement in providing basic services in city contexts. We have classified the various initiatives across different phases of the process of MSW in Bengaluru starting from awareness, segregation, collection, transportation, treatment and disposal. The data has been sourced across secondary sources and field based observations.

AWARENESS

Besides the BBMP, pressure groups of various forms/size are extensively promoting awareness creation campaigns towards bringing about transformations in the city. Awareness ranges across segregation, composting to 'beat plastic pollution' campaigns, a variety of innovative campaigns are designed and implemented in the city. Image 1 shows these campaigns viz., segregation-focused campaigns like SwachaGraha, school drives and Cubbon Park rally for anti-plastic campaigns. In addition, several training workshops have been conducted to educate traders, hawkers, hoteliers, restaurant owners and street vendors over plastic ban and plastic alternatives. In addition, meetings with Pourakarmikas are held to help them value segregation. Eco-clubs have been created across schools to educate children towards sustainable waste management practices. Interestingly, Solid Waste Management Round Table (SWMRT) framed a curriculum, namely Trashonomics, which aims to educate students on waste management practices. BBMP has released information booklets and documents to train Master Trainers or citizen volunteers with the focus on educating the staff. A Brand-Audit was also undertaken by SWMRT to identify the biggest polluter in plastic packaging branded litter. The audit indicated that around 61% of the total 12,000 pieces audited were multi-layered laminated packaging. BBMP had recently proposed to set up plastic-to-fuel plants where such multi-layered plastic packaging will be used. It is overwhelming that more than 200 citizen volunteer groups are working in Bengaluru in the waste management arena - viz. Bangalore Eco Team, HSR Citizen's Forum, Yelehanka Eco Group, etc. These groups are active on various social media platforms and have aided in bringing about transparency and accountability to the SWM system.

Image-1: Initiatives undertaken in Awareness in SWM process



Source: Field Observations

SEGREGATION

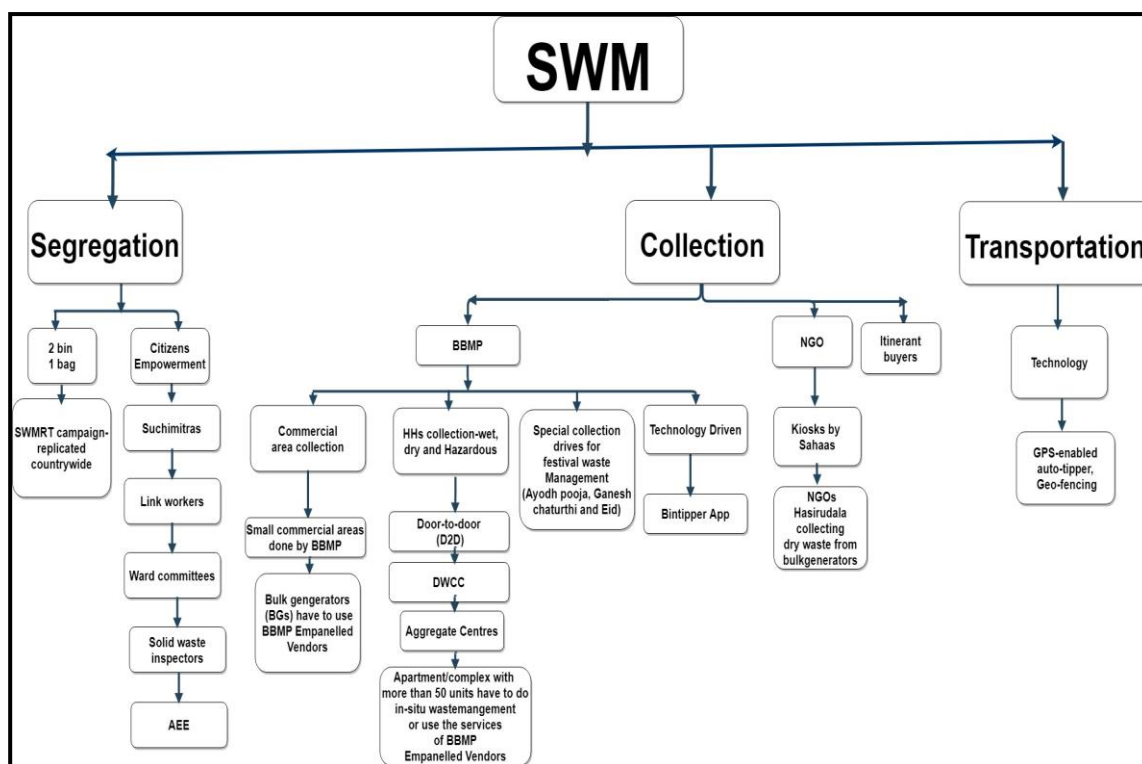
With respect to segregation, '2bin1bag' has been laudable initiative and been replicated across the country. '2bin1bag' is a system to segregate waste at source. The Karnataka High Court on Dec 17, 2015 passed an interim order due to the ongoing PIL filed by SWMRT directing the citizens in Bengaluru to adopt this system. More than two lakhs household have adopted this system in the city.

As indicated in Image 2, there are several initiatives taken up towards segregation by BBMP, NGOs, and Itinerant buyers. BBMP's major responsibility with respect to wet waste is collection on a daily basis, Door-to-Door (D2D) by a dedicated auto tipper. Similarly, dry waste is collected bi-weekly by a separate auto and is taken to a Dry Waste Collection Centre (DWCC) for further processing. In addition, separate arrangements have been made for bulk generators of waste like apartments, having more than 50 dwelling units and are supposed to do in-situ arrangements or avail services from BBMP-empanelled vendors. Similarly, commercial bulk generators, which accumulate MSW of a quantity not less than 10 kg per day, are supposed to do in-situ arrangements or empanel with BBMP vendors. Special arrangements are made to manage festival waste. Efforts are made to introduce technology in the collection process, like the BinTipper App that maintains a database of the quantum of waste collected on a daily basis by auto-tipper.

To complement the role of the BBMP, NGOs, Non-profit Organisations, and citizens group viz. Hasirudala, Sahaas, Janaagraha, Swachha, Bangalore Political Action Committee (BPAC), Solid Waste Management Round Table Bangalore (SWMRT), Hasirudala, Sahaas, Youth for Parivartan etc. Hasirudala helps bulk waste generators, like apartment complexes, to manage their dry waste. They have strived hard and played a critical role in helping the informal workers, rag pickers get official recognition from BBMP. So far, more than 7,500 rag pickers have been issued occupational identity cards. Likewise, many NGOs are playing a significant role at various levels. The role of informal sector in waste segregation and collection cannot be ignored. More than 15,000 waste pickers operate in Bengaluru who range from scrap dealers, municipal sweepers, itinerant buyers and dealers.

Post collection, transportation is the key and in SWM processes a crucial link. Transportation is taken up by auto-tippers, compactors and pushcarts. Efforts are in the process to install GPS-enabled compactors to monitor their movement to processing plant and landfills. Geo-fencing for auto-tippers is also being explored to monitor their movements.

Image 2: Initiatives in Segregation, Collection and Transportation in Bengaluru



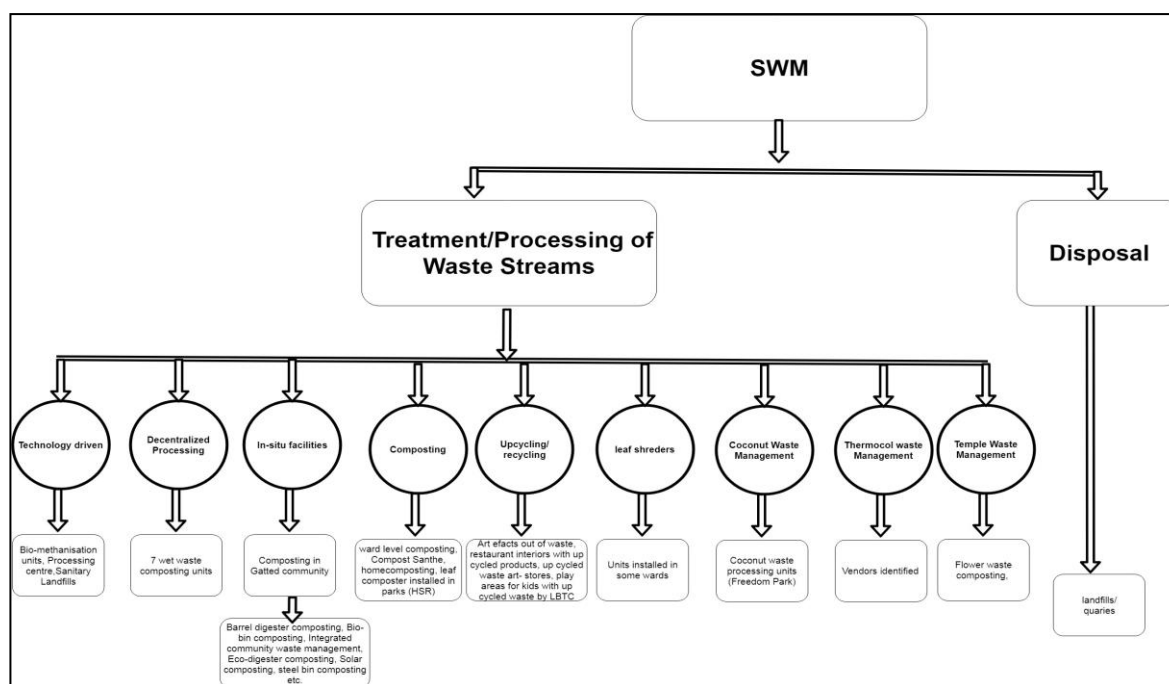
Source: Field Observations.

TREATMENT/PROCESSING AND DISPOSAL

In view of the assortment in waste types/waste streams, different treatment/processing amenities are set up for effective and decentralised waste management viz., like bio-methanisation units, processing centers, Sanitary Landfills, Ward-level composting and so on. Home composting, leaf composters installed in parks are also been promoted widely. To create awareness Compost Santhe is organized. As in-situ facilities, barrel digester composting, bio-bin composting, integrated community waste management, eco-digester composting, solar composting are installed. Leaf shredder units have also been installed in some of the wards. Coconut waste processing units have been installed in the city and thermocol waste processing units have been proposed. Special composters in temples for in-situ management of flower waste. Interestingly, several retail stores, with up-cycled products, are becoming popular in the city and a fad among several youngsters to use earthy products. Even a restaurant in the city – Green Path has been designed using up-cycled products.

For Disposal of waste, Bengaluru has three landfill quarries. BBMP has proposed the appointment of clean-up marshalls to monitor these landfills. These marshalls will be ex-servicemen with the state government and are trained personnel. A lot more efforts are required with respect to Disposal facilities.

Image 3: Initiatives in treatment and disposal of waste in Bengaluru



Source: Field Observations.

There are several other interesting initiatives taken in waste management. In order to promote zero waste events, a lot of events like seedball events, green weddings, terrace gardening are organised in the city. Seedball events mainly focus on increasing the green cover and involve golf-ball sized mixture of seeds, soil and compost, which are strewn to grow trees in open spaces. There are individuals who are focusing on green events like Green weddings to promote avoidance of disposable cutlery, single-use plastic and decorative items, etc. At large, they minimize waste generation to almost nil.

Terrace gardening initiatives in the city are intense. We see people passionately involved in gardening and holding events. These garden enthusiasts are great promoters of waste management as they prepare in-situ compost besides making the city green and other positive outcomes. In addition, the public events like IPL matches and marathons are promoting totally zero-waste events by avoiding plastic water bottles, avoiding usage of flex banners etc. Some restaurants across the city have stopped usage of plastic containers for home delivery and are also offering discounts when customers carry their own boxes from home.

Cutlery banks across the city have mushroomed to promote usage of steel cutlery and avoid plastics and disposables. Green Entrepreneurs offering products like bamboo toothbrush, steel and bamboo straws, seed papers, seed pencil, newspaper pencil and clay & seed ganesha etc are seen in huge numbers. Some of the restaurants in the city have designed their interiors with up cycled material and have showcased elegant interior designs and scope for further innovation.

Some of the private brands like Chai Point and Big Basket have shown the path towards sustainable practices. Chai Point collect and share used tea and coffee powder across their stores with farmers for use in vineyards. Big Basket has extensively worked on its packaging and has reduced the usage of plastic and cardboard boxes. These brands worked with some of the citizen's volunteers in the city to adopt green practices.

SOLID WASTE MANAGEMENT AND CHALLENGES IN FRONT

Although so much is done to address the waste management, the city still faces several challenges in reaching the goal of a clean city. We are yet to achieve cent percent proficiency across the levels discussed earlier. The challenge is to make it more extensive across the whole city. For instance, currently, there are five solid waste management-processing projects of BBMP. Out of these five projects, four projects have 1,900 MPTD of plant capacity while the fifth plant, with the capacity of 250 MPTD, is under pilot run. Out of the remaining four plants, only three are receiving a total of 700 MPTD of wet waste. Given that the city generates a total of 5,758.17 TPD of waste across small residential, commercial establishments, street sweeping, including bulk generators, 64% of this accounts for wet waste produced in the city on a daily basis. Followed by 28% of dry waste, 3% of domestic hazardous and 6% of reject/inert waste, the city has a long way ahead to efficient waste management and probably this justifies why waste management in the city is a moot point. It is important to note that, there is no data available on the amount of waste collected and transported to processing plants or landfill sites. This probably also indicates why there are numerous illegal garbage disposal sites and black spots in the city. However, a study by Ramachandra *et al* 2018 indicates that the proportion of municipal solid waste collected by the agencies disposed at identified sites is 60% while the remaining is disposed of at unidentified sites. Feasibility of alternatives, like waste-to-energy, is questionable given the high moisture content of waste as wet waste is higher in proportion in the city. Also the city still doesn't have a complete waste segregation model at source. The bio-methanisation

model has been initiated in a few wards; however, its potential as a decentralised waste processing system is at a nascent stage.

SUMMARY

The city has witnessed a lot of initiatives with respect to the whole process of waste management. Some of these have turned into success stories and have been replicated, not only in the city but also nationwide. Our observations at the field and discussions indicated that, all initiatives and success stories in the city had extensive stakeholders' participation, viz, citizens, municipal authorities, central and state governments, NGOs, citizen volunteers and informal sector, etc. These initiatives have also brought in transparency and accountability in the system of waste management in the city. Another interesting thing to note is that across the whole process of SWM, treatment and awareness have attracted a large number of initiatives while collection, transportation and disposal are the ignored phases or do not have any citizen's participation probably because transportation and disposal are solely in the hands of either BBMP or the private contractors. Waste collection has seen some private players and NGOs participation. A point to note here is that collection takes a major portion of the total budget of SWM in a municipality. According to a World Bank (2012) report, low-income countries tend to spend a major part of their SWM budget on collection, in some cases it being 80 to 90%, while almost ignoring disposal. The collection efficiency still remains very low in low-income countries.

Though there are several policy initiatives, as well as citizens involvement with respect to solid waste management in Bengaluru, however, all these initiatives and success stories are mostly isolated and cater to only a small area or group of people. Hence, an integrated approach towards waste management is the need of hour wherein all stakeholders and these initiatives are woven into the urban fabric to achieve a holistic and sustainable solution to the garbage menace. While the challenges are certainly widespread, there is hope, given the involvement of people and citizen networks in improving waste management.

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