

Theme 4-A: Waste Management

WASTE MANAGEMENT IN INDIA

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Abstract: As per MOEFCC, 62 million tonnes of waste was generated (1.69L TPD) in 2016. Of this, 5.6 million tonnes was plastic waste, 0.17 million tonnes was biomedical waste, 7.90 million tonnes was hazardous waste, 0.15 million tonne was e-waste. About 75-80% of the municipal waste is collected and only 22-28% of this is processed. Waste generation will increase from 62 million tonnes to about 165 million tonnes by 2030 and to 436 million tons by 2050. If cities continue to dump the waste at present rate without treatment, it will need 1240 hectares of land per year and with projected generation of 165 million tons of waste by 2031, the requirement of setting up of landfill for 20 years of 10 meters height will require 66,000 hectares of land. According to one estimate released in 2022, India's total methane emissions are in the range of 669MMtCo₂e, of which 10.3% is from the waste sector which includes emissions from landfills, sewers, waste water etc. About 4% of this is estimated to be from landfills and dumpsites alone.



Untapped waste can generate from biomass, 17.536 GW power, bagasse cogeneration 5 GW, waste to energy (WTE) 2.554 GW. The estimated total renewable potential amounted to 1096.080 GW including 1.3 million cubic metre of biogas per day from segregated wet waste, or 72 MW of electricity from biogas and 3.4 million metric tonnes of compost annually to support agriculture. Urban India per capita waste generation is 0.21 to 0.5 kg/person/day & Rural per capita waste generation is taken as 0.11 kg/person/day. While most cities have some kind of door-to-door or point to point collection systems in place, most villages have no systems in place for collection or processing. Hence, we need to implement all waste management Rules updated in 2016 in word and spirit.

Keywords: MOEFCC, Waste Management, Segregated, Renewable and landfills

FAECAL SLUDGE AND SEPTAGE MANAGEMENT IN INDIA

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Abstract: For people to live healthy and productive lives, they must have access to safe sanitation services. Poor sanitation has a big impact on health while the majority of India's water pollution comes from untreated sewage being thrown into water bodies.



Conventional sanitation systems have more serious drawbacks than just high costs as they overuse scarce renewable water resources, pollute land and groundwater, waste vital components in wastewater, and need highly technical efficiency to operate them. In order to effectively manage the issue of faecal sludge and septage, it is necessary to develop a comprehensive strategy that meets the bare minimum standards, is adequate and economical for all locations and suites people, and takes into account the specifics of each location. Environmentally friendly sanitation methods have been advocated as a solution to the sanitation crisis. Numerous Indian towns are already feeling the effects of insufficient safe and environmentally friendly sanitation in the form of serious water and soil contamination and health problems. In light of this, the current paper examines the state of faecal and septage management in cities and offers a road map for enhancing hygienic conditions.

Keywords: Sanitation Services, Water Pollution, Faecal Sludge and Septage

INFORMAL SECTOR AND WASTE MANAGEMENT

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India has a challenge and a great opportunity ahead of it where majority of our workforce is working in the informal sector particularly in the area of waste management. While it is difficult to map existing skills in the unorganized sector and gauge the skilling requirement in the sector, the rate of job growth in the informal sector is estimated at twice that of the formal sector. The importance of Recognition of Prior Learning (RPL) in India cannot be overemphasized. Any of these individuals working in the informal sector could be a candidate for RPL and depending upon the level of his or her competences, s/he could either be fit for full or partial certification.



RPL is the key instrument that can help to map the existing skills in the unorganized/informal sector and to integrate the informal sector into the formal skilling landscape. The RPL policy is linked to an outcome-based National Skills Qualification

Framework (NSQF) against which prior learning through formal/informal channels is assessed and certified. The RPL process includes a pre-assessment, a skill gap training and a final assessment leading to certification of existing skills for an individual. The RPL certification is on par with certifications following various skill trainings in the country. It provides both horizontal and vertical pathways to an individual for acquiring additional skills for better livelihoods.

Since RPL is the process of awarding formal recognition to competences that already have been acquired, there should not be any distinction between RPL certificates and certificates issued after formal training and education. This implies a rigorous quality-assured process for assessment and certification. Quality of assessment is critical to the success of the whole RPL process. Quality needs to be assured irrespective of the setting, whether it is in an assessment centre, through a worksite assessment process on the shop floor or in a training centre. Employers need to link the benefits of RPL assessment and certification to their enterprise. This could be achieved by linking the productivity of an individual to the productivity of the enterprise. In order to ensure the transition of workers from the informal into the formal sector, standardized assessable outcomes and/or national occupational standards need to be developed for informal sector jobs. New Sector Skills Councils (SSCs) need to be formed to represent informal sector workers.

AN IMPLEMENTATION ANALYSIS OF MUNICIPAL SOLID WASTE MANAGEMENT IN GAYA, BIHAR

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Abstract: In the onset of rapidly increasing urbanization and ever-increasing population issue of solid waste management is of huge concern, be it metro cities or small towns. There has been a massive increment in the amount of waste produced and it will keep increasing at severely high rate as well. The current condition of solid waste management in Bihar is struggling with several inefficiencies and scarcities such as weak infrastructure, financial crisis of municipal corporations and lack of modern technologies and machines to dump the waste. Unauthoritative dumping of these wastes is a grave concern for the security and quality of life for all living beings. This paper aims to study strategies of solid waste management by Municipal Corporation of Gaya district of Bihar. By using the importance performance analysis, this study is trying to identify those factors which are essential for the improvement of solid waste management. This



study uses mixed method and is based on primary field study. Semi structured questionnaire was used to collect data from households and officials. Since Gaya is one the aspirational district of Bihar. Gaya Municipal Corporation has a vast coverage area with different geographical scenario covering – plain land, hills, river and sarovars. Gaya Municipal Corporation has 53 wards in total and it covers population of 4,74,093 (Census 2011). As per the civic body of city, total solid waste generated in Gaya municipal is 250 million tons (2019). The major challenge lies in ensuring proper segregation of wastes as dry and wet wastes, door-to-door collection of segregated wastes from each household of all areas specially slum areas and lack of awareness on the part of citizens regarding the same.

Keywords: *Municipal Corporation, Solid Waste Management, Importance Performance Analysis, Waste, Gaya*

SOLID WASTE MANAGEMENT SERVICE IN URBAN INDIA IN LIGHT OF SOLID WASTE MANAGEMENT RULES 2016: CHALLENGES AND PROSPECTS

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Abstract: Nearly 34 percent of the Indian population resides in urban areas and their high dependency on packaged and readymade products has also given rise to the problem of waste management in the cities. According to the 74th constitutional amendment act, it is the duty of ULB (Urban Local Bodies) to keep the cities clean, but the problem is these local bodies have very less at their end to manage this, chaos. There is a lack of financial resources, institutional preparedness, technology, and lack of political will which hinders the effective management of waste in the cities. And we need to address the fact that the existing system of collection, transportation, and disposal of solid waste across India is not adequate to deal with the issue. The problem is not only limited to the management part it has a bigger connotation to it as it is leading to environmental degradation and some serious health hazard which we are witnessing nowadays with concerns like poor air quality, increasing pollution levels, increasing infection, and so on. Solid waste management rules which were revised in the year 2016 have prescribed some measures to deal with this problem but we need to see the practicality and extent to which these can be implemented and what needs to be changed to improve the implementation of these rules. This paper dissects the state of solid waste management in India and offers suggestions to improve the existing state of affairs in relation to waste management in cities. The study is based on secondary data sources and these sources have been analyzed in a systematic way to



identify the problems related to Solid Waste Management in urban India and the strategies to deal with this problem by incorporating the ideas suggested under the solid waste management rules 2016.

Keywords: *Solid Waste, Environmental Degradation, Pollution, Urban Local Bodies (ULBs), Solid Waste Management (SWM) Rules*

STATUS OF SANITATION PROVISION IN SLUMS OF DELHI: BUDGET ANALYSIS, AND POLICY ASSESSMENT

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Abstract: Sanitation is a basic human need and a significant aspect in leading a healthy life. However, recent studies highlight that only in urban India; about sixty million people face inadequate toilet facilities. The situation is more concerning in slums of megacities like Delhi where they constitute as high as forty percent of the total population.



In the socio-political reality of Indian cities, poor people are deficient citizens; they, in general, reside in densely packed slums. It is the fundamental responsibility of the government to provide these services to ensure well-being of its citizens. In case of slums, due to spatial and financial constraints, a community toilet facility seems a viable option to the government. This study endeavours to understand the trajectory of provision for urban sanitation in slums of Delhi. To achieve this objective, assessment of the policy intervention and several programmes of the union and the state governments and public outlay and expenditure analysis of budget documents of the state and local government for five years (2015-16, 2016-17, 2017-18, 2018-19, and 2019-20) has been done. This study also tries to capture the status of community toilet in slums of Delhi. This study finds lack of transparency and accountability, discrepancy in budgeting process in the provision of sanitation service due to involvement of multiple institutions and multiple land-owning agencies of the slums. Sanitation sector has remained in the top five prioritised sectors in terms of budgetary allocation during selected years in the study. Although a decreasing trend in budgetary allocation for sanitation has been observed, fund utilisation efficiency has increased over the years. This study also observes high inequality in the distribution of community toilet blocks and high variation in average number of households served per community toilet blocks across slums.

Key Words: *Sanitation Facility, Slums, Delhi, Urban Sanitation Policy, Community Toilets, Public Expenditure*

DECENTRALISED WASTE MANAGEMENT IN MEGA CITIES: A CASE STUDY OF BENGALURU

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Abstract: The paper is based on a study of waste management in Bengaluru aims to bring together the main features of prominent models of waste management in India's fastest mover mega city (2021) and the lessons drawn for suitable adaptation among Indian cities and elsewhere. It is found that over half of the waste (53%) is segregated in Bengaluru and processed among specific models.



Which is a major land mark for a mega city in developing economies. These models bring alternate methods of segregation, collection and local and decentralized treatment leading to drastic reduction in the quantity of waste. BBMP has played a central role to facilitate, coordinate, engage and handhold the multiple stakeholders involved in the process. Some initiative deserve special mention namely: two fold collection from bulk generators and others along with segregation at source, ward committees for Micro-plan for 750 households, integrated waste management at ward level, Coconut waste processing, local composting, apartment based water treatment and Kalika Kendra (Training Centre) to display options and manufactures.

This paper also brings together the experience on fifteen waste management (SWM) models in Bengaluru which is the Fastest Mover Megacity in India as per recent National Swachh Sarvekshan (Sanitation, Survey), 2021. The analysis on models cover main features, process, stakeholders involved (partners), institutional fiscal arrangements, outcome and replicability potentials. The paper also suggests scaling up strategy and lessons for cities in India and elsewhere. Further, the focus on water plus city is also included with recycling of water at local and decentralized level. Finally, the paper concludes with scope and strategy for scaling up models in Bengaluru itself and also a twenty one point agenda for various stakeholders in India and elsewhere to follow their mission on waste management.

Keywords: Waste Management, developing economies, Sanitation and Swachh Sarvekshan