



## Developing Sustainable Legal Paradigm in Management of Municipal Solid Wastes in India: An Overview

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### ABSTRACT

India is now among the top ten countries generating the highest amount of Municipal Solid Waste (MSW) due to growing urbanisation and high consumption. As per report published by UN Habitat, on collection of Municipal wastes in developing countries and working paper by UNDP/UNCHS (Habitat)/World Bank/SDC Collaborative Program on Municipal Solid Waste management, In developing countries, because of the size of their urban populations, in part because their city dwellers are prospering, adopting high-consumption lifestyles, rapid urbanization and accelerated economic development within the rapidly growing advanced technological societies, the municipal co-operations are unable to handle the increasing amount of municipal solid waste, and this uncollected waste being left unattended, spreads on roads and in other public areas leading to tremendous air pollution, contamination of water bodies, destruction of land, and enormous negative impact on human health. The nature of municipal solid waste is a term usually applied to a heterogeneous collection group of waste produced in urban areas, the nature of which varies from region to region. The common problem faced by all fast developing countries, is the disposal of municipal solid waste and availability of land fill site area besides need of strong laws which help in regulating and control of municipal waste generation. It is an intricate and complex problem because land is part of ecosystem and land pollution cannot be isolated, so it primarily involves the policy perspective question. This study analyzes problem of MSW in India and highlights the legal paradigm to handle this growing problem. This study analyses the changing trend in the MSW quantities and characteristics in major urban agglomerations in India and emerging legal angle to handle this intricate issue of 21<sup>st</sup> century.

**Keywords:** Municipal Solid Waste, Urbanization, Waste Generation, Landfill Area, Environment Laws.

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## INTRODUCTION

Municipal Solid-waste management is a major challenge in urban areas throughout the world particularly so in India. Without an effective and efficient solid-waste management program, the waste generated from various human activities, both industrial and domestic, can result in health hazards and have a negative impact on the environment. Understanding the waste generated, the availability of resources, and the environmental conditions of a particular society are important to developing an appropriate waste-management system. In its scope, municipal solid-waste management includes all administrative, financial, legal, planning, and engineering functions involved in the solutions to all problems of municipal solid waste. The solutions may involve complex interdisciplinary fields such as political science, city and regional planning, geography, economics, public health, sociology, demography, communications, and conservation, as well engineering and materials science.

The generator of municipal solid waste is broadly classified as residential, industrial, commercial, institutional, construction, demolition, municipal, and agricultural types<sup>i</sup>. Fast developing economies like India which is the second largest nation in the world, with a population of 1.21 billion (which nearly accounts 18% of world's human population) does not have enough resources or adequate systems in place to treat its solid wastes mores so municipal solid waste which is also generated by human and animal activities. Fast economic development, rapid urbanization, and improving living standard in cities of these developing nations have lead to manifold increase in the quantity and complex composition of municipal solid waste which is hard to dispose off.

The total Indian urban population amounts to approximately 285 million and the population growth rate in urban India is high. The percentage of the total population living in urban areas shows a continuous increase. It grew a rate of 31.8% during the last decade to 377 million, which is greater than the entire population of US, the third largest country in the world according to population<sup>ii</sup>. Management of municipal solid waste resulting from rapid urbanization has become a serious concern for government departments, pollution control agencies, regulatory bodies, and public in most of the developing countries<sup>iii</sup>. India is facing a sharp contrast between its increasing urban population, available services, and resources to handle solid wastes. In fact India has an enormous gap to fill. Municipal solid waste management is one of the much neglected areas of urban development<sup>iv</sup>. In India most of the municipal waste is left unattended<sup>v</sup>. Proper municipal solid waste disposal systems, waste handling and management technology to address the issue burgeoning amount of wastes are more or less absent in India. The activities associated with managing municipal solid waste from the generation point to final disposal normally include generation, reduction, reuse, recycling, handling, collection, transfer and transport, transformation (e.g., recovery and treatment), and disposal. Depending on site specific conditions, a sound waste-management program can be established by combining some of the necessary activities into integrated solid-waste management. This has resulted into unhygienic and unhealthy environment which is major threat to public health and environmental quality<sup>vi</sup> and gives rise to the insanitary conditions resulting into many diseases like malaria, typhoid, jaundice, dengue, flu etc. On the other hand, legislative efforts and effective implementation are vital for the safe management and disposal of municipal solid waste. Incentives may be provided for the development and practice of safe treatments, harmless manufacturing processes, and methods for converting solid waste into valuable resources by recycling and reuse. Various reports of Planning Commission have showed a rapid decline in the standard of services with respect to collection and disposal of municipal waste. Therefore, controlling pollution to reduce risk of poor health, to protect the natural environment,

and to contribute to our quality of life is a key component of sustainable development<sup>vii</sup> which needs to be addressed effectively in India.

## METHODS

### Present Status of Solid Wastes in India

In India, growing urbanization, rapid industrialization, an increase in economic status of population, and various other activities have increased the quantity of municipal solid waste and altered its contents. Although developing countries generate less solid waste per capita in comparison to developed countries, the collection, storage, transportation, processing, and disposal of solid waste is highly ineffective, and consequently damaging to the environment. Solid-waste management practices in developing countries like India are far from satisfactory, and the associated problems are due to a lack of technical expertise, financial constraints, and legal provisions. Generally, state and municipal governments consider solid waste a low priority, and consequently give less budgetary support to this field. Slow decision-making processes in the municipalities create an additional hindrance. In a broader sense, municipal solid-waste management is a very complex task, as the social, economic, and cultural cooperation among households, communities, enterprises, and municipal authorities is minimal and a lack of awareness of the rules and regulations, as well as environmental concerns with poor resources, have created a chaotic situation.

Due to rapid industrial growth and migration of people from villages to cities, the urban population is increasing rapidly and so is waste generation which has been observed to increase annually in proportion to the rise in population and urbanization. The per capita generation of municipal solid in terms of kg/capita/day, has shown a positive correlation with economic development at world scale and also in India<sup>viii,ix</sup>. The per capita Municipal solid waste generation rate in India has increased from 0.44 kg/day in 2001 to 0.5 kg/day in 2011, fuelled by changing lifestyles, and increased purchasing power of urban Indians centres<sup>x</sup>. As more land is needed for the ultimate disposal of these solid wastes, issues related to disposal have become highly challenging<sup>xi</sup>. Urban population growth and increase in per capita waste generation have resulted in a 50% increase in the waste generated by Indian cities within only a decade since 2001.

There are 53 cities in India with a million plus population, which together generate 86,000 TPD (31.5 million tons per year) of municipal solid waste at a per capita waste generation rate of 500 grams/day. The total municipal solid waste generated in urban India is estimated to be 68.8 million tons per year (TPY) or 188,500 tons per day (TPD) of municipal solid waste. Such a steep increase in waste generation within a decade has severed the stress on all available natural, infrastructural and budgetary resources. Big cities collect about 70 - 90% of municipal solid waste generated, whereas smaller cities and towns collect less than 50% of waste generated. More than 91% of the municipal solid waste collected formally is land filled on open lands and dumps<sup>xii</sup>. It is estimated that about 2% of the uncollected wastes are burnt openly on the streets. About 10% of the collected municipal solid waste is openly burnt or is caught in landfill fires. The pollutants include carbon monoxide (CO), carcinogenic hydro carbons (HC) (includes dioxins and furans), particulate matter (PM), nitrogen oxides (NO<sub>x</sub>), and Sulphur dioxide (SO<sub>2</sub>)<sup>xiii</sup> etc. Although India has formulated legislation relating to municipal solid waste, hazardous waste, and biomedical waste, the compliance and awareness of rules among communities and municipalities are lagging behind.

## Characteristics and Composition of Municipal Solid Wastes

In highly populated countries such as China and India and others such as Turkey, Mexico, and Brazil most of the solid waste is usually destined to landfills and dumps<sup>xiv,xv,xvi,xvii</sup>. As compared to the western countries, municipal solid waste differs greatly with regard to the composition and hazardous nature, in India<sup>xviii,xix,xx</sup>. Many categories of municipal solid waste are found such as food waste, rubbish, commercial waste, institutional waste, street sweeping waste, industrial waste, construction and demolition waste, and sanitation waste. Municipal solid waste contains compostable organic matter (fruit and vegetable peels, food waste), recyclables (paper, plastic, glass, metals, etc.), toxic substances (paints, pesticides, used batteries, medicines), and soiled waste (blood stained cotton, sanitary napkins, disposable syringes)<sup>xxi,xxii</sup>. Municipal solid waste composition at sources generation and collection points, is determined on a wet weight basis. It mainly consists of a large organic fraction (40–60%), ash and fine earth (30 – 40%), paper (03 – 06%) and plastic, glass and metals (each less than 1%). The C/N ratio ranges between 20 and 30, and the lower calorific value ranges between 800 and 1000 kcal/kg<sup>xxiii</sup>. Comparing conditions related to MSW management in developed and developing countries brings indicators that quantify the problem. Considering the MSW generated in general, its main constituents are to some extent similar throughout the world, but the quantity generated, the density and the proportion of streams vary widely from country to country depending mainly on the level of income and lifestyle, culture and tradition, geographic location and dominant weather conditions. Low income countries with yearly per capita GDP that does not exceed US\$ 5000 have the lowest MSW generation rates, which are in the range 0.3 – 0.9 kg/capita/day. The increase in per capita daily generated waste is found linearly proportion to the per capita GDP. In high income countries it reaches a range of 1.4 – 2.0 kg/capita/day<sup>xxiv</sup>.

Another element that characterizes differences between the generated MSW in low and high income countries (developed and most developing countries) is the percentage composition of MSW constituents. There, the lifestyle of peoples decisively characterizes the percentage composition where organic waste stream and overburden form more than 50% of the total generated MSW essentially due to habit of using fresh vegetables. This is the opposite in high income countries, where lifestyle favours fewer homes cooking, relying mainly on the readymade backed food. This is reflected in the figures that represent the percentage of organic waste stream which does not exceed an average of 30% of the total generated waste and that more packing material characterizes the MSW<sup>xxv</sup>.

The high biodegradable fraction combined with the tropical climate warrants frequent collection and removal of refuse from the collection point. The ash and fine earth content of Indian municipal solid waste is high due to the practice of inclusion of the street sweepings, drain silt, and construction and demolition debris in municipal solid waste. The high ash and earth content increases the density, which is between 330 and 560 kg/m<sup>3</sup>. The organic content of the samples on a dry weight basis ranges between 20 and 40%. The nitrogen, phosphorus, and potassium contents of the municipal solid waste range between 0.5-0.7, 0.5-0.8 and 0.5-0.8 % respectively<sup>xxvi</sup>. The calorific value ranges between 200 -3000 Btu/lb. It is clear that most of the generated MSW constitutes decomposable and recyclable materials. If properly managed, such MSW would provide high opportunities for the development of the socio-economy of the developing countries. However, the fact is that MSW remains a most important socio-economic problem of these developing countries.

## **Legal Paradigm**

As per guidance note “Municipal Solid Waste Management on a Regional Basis” prepared by Ministry of Urban development, Government of India, the responsibility for solid waste management lies with the respective Urban Local Bodies (ULBs), consisting of municipal corporations, municipalities, nagar panchayats, etc., (collectively referred to as the ‘Authorities’). The Municipal Solid Waste (Management and Handling) Rules, 2000 (the ‘MSW Rules’), issued by the Ministry of Environment and Forests, Government of India, under the Environment (Protection) Act, 1986, prescribe the manner in which the Authorities have to undertake collection, segregation, storage, transportation, processing and disposal of the municipal solid waste (the ‘MSW’) generated within their jurisdiction under their respective governing legislation.

Municipal solid waste management systems adopted in Indian cities are highly inefficient, outdated, technologically poor, and lacks public participation. Compliance with the MSW Rules requires that appropriate systems and infrastructure facilities be put in place to undertake scientific collection, management, processing and disposal of MSW. However, it has increasingly come to the attention of the national (and state) government that, individually, the Authorities are unable to implement and sustain separate and independent projects to enable scientific collection, management, processing and disposal of MSW. This is mainly due to lack of financial and technical expertise and scarcity of resources, such as land and manpower, with the Authorities, which makes it difficult for them to discharge their obligations individually in relation to scientific collection, management, and processing, and disposal of MSW.

By and large public apathy is observed in the matter of handling and disposal of municipal solid waste. A system of throwing garbage on the streets by citizens and local bodies collecting the waste from the streets and disposing it of in the most unhygienic manner is in trend. These systems can be corrected by taking concerted measures involving the public at large through their active participation in the process, and by the local bodies performing their duties effectively. Solid waste management practices can never reach the desired level of efficiency until the public participates and discharges its obligation religiously. The system therefore, can only be improved by modernizing the solid waste management / handling system by the urban local bodies, ensuring effective public participation, and by providing adequate legislative support for taking punitive measures which is still inadequate and lacking in implementation.

## **Legislation, Regulation, and Policies of Government of India**

### **Indian Constitution and Solid Waste Management**

The Indian constitution gives the states a scaffold of powers and functions, so to maintain the health of citizens of India. Management of solid waste falls under Article 21 of Constitution of India - *Right to Life and clean environment* includes maintenance of health and preservation of sanitation falls because it adversely affects the health and life of citizens, in the event of default.

Article 243(W) of the Constitution of India provides for the powers, authority and responsibility of the Municipalities. Under this article municipalities are empowered to carry out the functions listed in the Twelfth Schedule of the Constitution<sup>xxvii</sup>. Several provisions in the Directive Principles of State Policy define the state’s role in protecting the marginalized and weaker sections of society, ensuring better wages and the protection of the environment. Article 47 imposes a duty on the state to improve the standard of living and public health of its people. The Constitution also imposes certain duties on citizens of the country. Article 51(A) of the Indian Constitution obliges every

citizen to protect and improve the environment. This duty of the citizen has been reiterated in Municipal Solid Waste Management Rules, 2000 wherein citizens are required to segregate and dispose waste in the manner prescribed under the Rules<sup>xxviii</sup>.

### **Statutory Provisions for Regulation of Solid Wastes:**

Many acts and regulations relating to protecting the environment have come up from time to time. These are described in the section entitled “National Environmental Regulatory Framework” above. The rules pertaining to solid-waste management are as follows.

- Hazardous Waste (Management and Handling) Rules (1989, amended January 2003): These rules deal with controlling the generation, collection, treatment, disposal, import, storage, transport, and handling of hazardous waste.
- Biomedical Waste (Management and Handling) Rules (1998): These rules are legally binding on healthcare institutions to streamline the process of proper handling (segregation, collection, treatment, and disposal) of hospital waste.
- Municipal Solid Waste (Management and Handling) Rules, 2000: These rules deal with the scientific management of municipal solid waste by ensuring proper collection, segregation, storage, transportation, processing, and disposal of municipal solid waste.
- The Batteries (Management and Handling) Rules (2001): These rules apply to every manufacturer, importer, re-conditioner, assembler, dealer, recycler, auctioneer, consumer, and bulk consumer involved in the manufacture, processing, sale, purchase, and use of batteries or components thereof.

In India, solid waste management services are provided by the civic bodies as per the provisions of the respective Corporation/Municipal/Panchayat Acts. However most state legislation does not cover the necessary technical or organizational details of municipal solid waste management as many of the Acts are quite old and stated provisions needs amendments to reflect to the changes in handling and disposing wastes. Laws talk about sweeping streets, providing receptacles in various parts of the city for storage of waste, and transporting waste to disposal sites in general terms, but they do not clarify how this cleaning shall or can be done. The municipal acts do not specify in clear terms which responsibilities belong to the citizens (for example, the responsibility not to litter or the accountability for storing waste at its source). Moreover, they do not mention specific collection systems (such as door-to-door collection of waste), do not mandate appropriate types of waste storage depots, do not require covered waste transport issues, and do not mention aspects of waste treatment or sanitary landfills, but provisions of local laws and criminal laws are invoked for regulation of municipal waste. Given the absence of appropriate legislation or of any monitoring mechanism on the performance of municipal authorities, the system of waste management has remained severely deficient and outdated. Inappropriate and unhygienic systems are used. At disposal sites, municipal authorities dump municipal waste, human excreta from slum settlements, industrial waste from small industrial establishments within the city, and biomedical waste without imposing any restrictions, thus provoking serious problems of health and environmental degradation<sup>xxix</sup>.

The Municipal Solid Waste (Management and Handling) Rules (2000) and Dr. Burman’s committee report<sup>xxx</sup> on the status of solid-waste management in Class I cities clearly indicated the following measures for improving solid-waste management practices: prohibit street littering, organize a waste-collection system, conduct awareness programs, provide adequate community

storage facilities and color-coded bins, promote segregation at the source, covered transport vehicles, process waste through appropriate technologies including the composting, recycling, and recovery of materials.

### **Indian Penal Code invoked in Solid Waste Management**

Though there is no direct section in the Code which deals with the problem of solid waste BUT Regulation of Municipal waste fall under section 268, 269, 277, 278, 290, 291, 425, 426, 430, 431 and 432 of Indian Penal Code. From the British rule only solid waste is equated with 'public nuisance' under IPC and an action of public nuisance and mischief can be brought against a person under the above mentioned sections Because solid waste gives rise to various types of diseases and is dangerous to public health; it has been treated as 'public nuisance'. Chapter XIV "offences affecting the public health, safety, convenience, decency and morals" of Indian Penal Code deals with solid waste management<sup>xxxix</sup>.

#### **a. The Criminal Procedure Code and Solid Waste Management**

Preventive measures against the nuisance caused by disposal of solid waste are dealt in The Criminal Procedure Code. Sections 133-144 of the Criminal Procedure Code<sup>xxxix</sup> deals with comprehensive document on preventive actions under which magistrates are empowered to take action for abatement of nuisance. The Courts have made use of Section 133 of the Code widely to deal with the problem of solid waste management. Section 133 of the Criminal Procedure Code, 1973 deals with 'removal of nuisance' and the Sub- Divisional Magistrate or any executive Magistrate can enforce the compliance of duties, if there is any failure on the part of the local bodies to abate nuisance, they can make order to remove the public nuisance and desist from carrying any trade, business which is causing public nuisance.

In *Municipal Corporation, Ratlam v. Shri Vardhichand*<sup>xxxix</sup> Justice Krishna Iyer declared that '...the guns of Section 133 go into action wherever there is public nuisance. The public power of the Magistrate under the Code is a public duty to the members of the public who are victims of the nuisance.' If the order is defied or ignored it is a punishable offence under Section 188, I.P.C. In court in the above mentioned case also held that 'imperative tone of S. 133, Cr.P.C. read with the punitive temper of S. 188 I.P.C. makes the prohibitory act a mandatory duty.' The Court also held that Article 47 of the Indian Constitution makes it a paramount principle of governance that 'steps are taken for the improvement of public health as amongst its primary duties.'

#### **b. Torts Law and Solid Waste Management**

The injury sustained on account of disposal of solid waste can be remedied by instituting an action for private nuisance or trespass under tort law.

#### **c. The Police Act, 1861 and Solid Waste Management**

The police act, 1861 also deals with regulation of solid waste. Section 34 of this act deals with prevention and control of throwing dirt into the streets, and it is also a punishable offence with a fine of fifty rupees or imprisonment not exceeding 8 days<sup>xxxix</sup>.

#### **d. State Legislations for Control and Prevention of Solid Waste Management**

The handling of waste disposal comes under the sphere state activity because public health and sanitation are state subjects falling under entry 6 of state list. So the local bodies are responsible for collection and disposal of wastes. The civic authorities are required to take adequate measures for control and prevention of waste management. There are municipal statutes passed by different states for control and prevention of solid waste for example the Madhya Pradesh Municipal Corporation Act, 1956 in Madhya Pradesh. The local civic authorities in various states like Uttar Pradesh, Bihar, Punjab, Tamil Nadu, West Bengal etc<sup>xxxv</sup>.

However these Municipal Statutes do not provide the standards for solid waste disposal. Additionally these authorities lack proper training of management of solid waste due to inadequate finances. They also lack infrastructure and monitoring facilities. These statutes have yet not curtailed the problems of unscientific and unhygienic problem of solid waste disposal.

#### **e. Environment Pollution Control Act and Solid Waste Management**

The Environment Protection Act (EPA), 1986 is the umbrella Act that pertains to management of solid waste in the country. The Ministry of Environment and Forest (MoEF), Govt. of India issued a notification on the 25<sup>th</sup> September, 2000 under the Environment Protection Act 1986 stating that all cities and towns of India should undertake municipal solid waste management as prescribed by the rules. These are known as "The Municipal Solid Waste (Management & Handling) Rules 2000". However, the act is aimed at protection of general environment does not specifically take care of solid waste problem as the primary emphasis of the act has been regulation of hazardous waste and it not that potent instrument for the abatement of land pollution caused by unscientific management of municipal waste<sup>xxxvi</sup>.

#### **f. The Municipal Solid Waste (Management & Handling) Rules 2000**

The purpose of this rule is to regulate the management and handling of municipal solid waste under Environment protection Act, 1986. And it applies to every municipal authority for collection, segregation, storage, transportation, processing and disposal of municipal solid wastes<sup>xxxvii</sup>. These rules were framed in order to make the municipalities well aware of their responsibilities so that they can implement the same. The rules consist of nine rules and four schedules. The duties of state pollution control board is to monitor the compliance of the standards regarding ground water, ambient air, leachate quality and the compost quality including incineration as specified under Schedule II, III and IV. Also state pollution control boards have duty of granting authorisation for setting up waste processing and disposal facility including landfills but before granting permission the views of the State Urban Development Board, Town and Council Planning Department, Airport or Airbase Authority and Ground Water Board, etc are taken. Additionally state boards can implement and review of standards and guidelines and compilation of monitoring data in coordination with Central Pollution Control Board<sup>xxxviii</sup>.

#### **Judicial Pronouncements**

In *Rampal Vs State of Rajasthan*<sup>xxxix</sup> the court held that municipal boards were primarily responsible for maintaining sanitation and for taking proper steps for creating and maintaining a healthy environment within municipal area.

In *Dr. B.L. Wadhwa Vs Union of India*<sup>xl</sup> Supreme Court directed CPCB and the Delhi Pollution Control Committee to inspect different areas of Delhi and New Delhi to ascertain that the



collection, transportation and disposal of garbage/waste are carried out satisfactorily. In *Virendar Gaur v. State of Haryana*<sup>xli</sup> the Supreme Court has declared that right to life under Article 21 encompasses right to live with human dignity, quality of life, and decent environment. Thus, pollution free environment and proper sanitary condition in cities and towns is considered to be integral part of right to life.

The case which drew attention of people all over the nation was *Almitra H. Patel v. Union of India*<sup>xlii</sup> writ petition was filed by Almitra H. Patel regarding the management of solid waste disposal in four metropolitan cities namely, Mumbai, Chennai, Calcutta, and Delhi. The court appointed a Committee headed by Mr. Asim Burman to look into the aspects of 'municipal solid waste management. This case compelled the environmentalists, administrators and lawyers to give serious thinking to the growing problem of solid waste management and as a result of which the Central Government compelled to notify the Municipal Solid Waste (Management and Handling) Rules, 2000.

In *M.C. Mehta v. Union of India*<sup>xliii</sup>, the Supreme Court directed the Kanpur Nagar Mahapalika to take action under the provisions of the U.P. Municipalities Act, 1916 so as to prevent the pollution the water in the river Ganga on account of waste accumulated at dairies and other solid waste items.

In *D.K. Joshi v. C.S. State of U.P*<sup>xliiv</sup>, Supreme Court directed the State Government to constitute 'monitoring committee' to look after work of public authorities including the disposal of solid waste in city area.

The above discussion highlights the various legislations/rules applicable to Solid Waste Management which are undoubtedly stale in their content given the fast changing quantity and nature of solid waste dumped in urban and rural areas. The amendment to the regulations sounds a clarion call with public participation at its core the underpinning rationale being augmentation of the disposal network and rejecting the erstwhile approach of state bodies handling all the waste material.

The proposition can be best explained as follows

The status quo presents a picture whereby criminal & civil consequences are attached to any legal wrong arising post the disposal activity. This approach ignores the idea that pre disposal stage is equally or perhaps more important than disposal itself, moreover for the pre-disposal stage the guidelines provided by the state are voluntary in nature and lack the force of law. In simple words, public participation can be obtained and encouraged by regulating the pre-disposal scenario by imperative rules and regulations.

### **Policy Issues in Municipal Solid Waste Management**

A grand policy framework to give a direction and thrust to environmentally sound and sustainable waste management does not exist in India. As per the Constitution of India, Solid Waste Management is a state subject and it is the primary responsibility of state governments to ensure that appropriate solid waste management practices are introduced in all the cities and towns in the state. The role of Government of India is broadly to formulate policy guidelines and provide technical assistance to the states/cities whenever needed. It also assists the state governments and local bodies in human resource development and acts as an intermediary in mobilizing external assistance for implementation of solid waste management projects.

Though municipal solid waste is a State subject, it is basically a municipal function and as such urban local bodies are directly responsible for performing this important activity. The 74<sup>th</sup> amendment of the constitution also envisages the urban local bodies to shoulder this responsibility. The urban local bodies in the country are, therefore, responsible and required to plan, design, operate, and maintain the solid waste management system in their respective cities/towns. Though solid waste management is an obligatory function of the urban local bodies, this service has been poorly performed by most of them resulting in problems of public health, sanitation, and environmental degradation. With rapid pace of urbanization, the situation is becoming more and more critical day-by-day. Infrastructure development is not in a position to keep pace with population growth owing to poor financial health of most of the urban local bodies. Lack of financial resources, institutional weakness, improper choice of technology, lack of public participation in solid waste management, non-involvement of private sector, etc., have made the service far from satisfactory. There is, therefore, a need to handle this problem in a concerted manner and adopt strategies to tackle all aspects of waste management scientifically involving private sector wherever necessary and possible. A policy framework is, therefore, necessary to guide and support the urban local bodies in the country for managing the solid waste scientifically and cost effectively.

Policy measures and incentives to promote waste minimization, recycle and recovery are rather bleak. Besides this no national targets have been set up to deal with overall issue of waste management in line with country's economic development programme. The environmental policies are 'discharge end control' based instead of shifting to 'source end control' based approach. The industrial policies continue to rely on manufacturing from virgin resources and a rational pricing mechanism and/or market based instruments to accelerate waste minimization and support greater use of recycled materials are not in place. Most of the current policies are in support of end-of-pipe approach creating huge burden on municipal authorities. There are no policies to promote segregation and reuse at source and conversion of waste into useful materials/energy.

## CONCLUSIONS

Fast developing India is currently facing a municipal solid waste dilemma, for which all elements of the society are responsible. The municipal corporation in India are responsible for cleaning solid waste management but except Chandigarh and Surat none of the cities in India are clean. The possible reasons for poor implementation could be a combination of policy issues, legislative issues, technical issues, supportive issues, and financial issues. On policy front government has to formulate strategic MSW management plan with periodic audits. Wherever required, the central/state government should initiate actions to amend the municipal acts concerning incentives/disincentives. Develop regulations and laws and also set up a mechanism for recovering materials, recycling, and source reduction to encourage the recycling industry. Review of laws relating to SWM in accordance with the current situation and imposing higher tariffs on commodities with packaging or that generate high volume of refuse should be enforced. Finance is an important resource for sustainable waste management. Generally most of the municipal corporations do not have many resources due to various constraints and priorities. Municipal corporations should have a "polluter-pays" principle and a compulsory tax on MSWM. Applying MSWM without a local perspective would be misleading on the part of developing countries. It is desirable to introduce locally suited MSWM technology after a detailed study of the ground realities. Public awareness, public participation, strong political will, coupled with strong legal

paradigm is essential for the successful and integrated approach towards sustainable management of municipal solid wastes in the country.

## REFERENCES

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- [1]. Sehker, M. and P.V. Beukering (1998): Integrated solid waste management: A perspective on Bangalore (India), CREED Working Paper Series No. 24, 277-295
- [2]. Census of India, 2011. Census of India. [Online]
- [3]. Glawe, U., C. Visvanathan and M. Alamgir (2005): Solid waste management in least developed Asian countries – A Comparative Analysis International Conference on Integrated solid waste management in Southeast Asian cities, Siem Reap, Cambodia 5-7 July.
- [4]. The Eleventh Planning Commission figures again estimate 70 to 90% efficiency in urban waste collection in large metros and below 50% in small towns. See Government of India, Eleventh Planning Commission, Report of the Working Group on Solid Waste Management on Urban Development excluding Urban Transport), Urban Water Supply and Sanitation (including Low Cost Sanitation, Sewerage & Solid Waste Management) and Urban Environment for Eleventh Five Year Plan (2007-2012) accessed at :  
[http://planningcommission.nic.in/aboutus/committee/wrkgrp11/wg11\\_urbandev.pdf](http://planningcommission.nic.in/aboutus/committee/wrkgrp11/wg11_urbandev.pdf).
- [5]. Government of India Planning Commission, Report of High Power committee on Urban Solid Waste Management (1995).
- [6]. Studies on Environmental Quality in and around Municipal Solid Waste Dumpsite. Arun K. Biswas, Sunil Kumar, S. Sateesh Babu, J. K. Bhattacharyya, Tapan Chakrabarti. 2, Kolkata, Nagour: Resources, Conservation and Recycling, 2010, Vol. 55
- [7]. National Environmental Engineering Research Institute, NEERI. Air Quality Assessment, Emissions Inventory and Source Apportionment Studies: Mumbai. New Delhi : Central Pollution Control Board (CPCB), (2010)
- [8]. CPHEEO (Central Public Health and Environmental Engineering Organization), (2000). Manual on Municipal Solid Waste Management. Ministry of Urban Development, Govt. of India, New Delhi
- [9]. Burnley, S.J., Ellis, J.C., Flowerdew, R., Poll, A.J. and Prosser, H. (2007) 'Assessing the composition of municipal solid waste in Wales', Resources, Conservation and Recycling, Vol. 49, pp.264–283.
- [10]. Sharholly, M., Ahmad, K., Vaishya, R., Gupta, R., (2007). Municipal Solid Waste characteristics and management in allahabad, India. Waste Management 27 (4), 490–496.
- [11]. Idris, A., Inane, B., Hassan, M.N., (2004). Overview of waste disposal and landfills/dumps in Asian countries. Material Cycles and Waste Management 16, 104–110.
- [12]. Kumar, Sunil. Effective Waste Management in India. INTECH CROATIA. (2010)
- [13]. National Environmental Engineering Research Institute, NEERI. Air Quality Assessment, Emissions Inventory and Source Apportionment Studies: Mumbai. New Delhi: Central Pollution Control Board (CPCB), (2010).

- [14]. UNSTAT, (2007)., Waste. United Nations Statistic Division Environment Statistic. Available from: <http://www.unstats.un.org/unsd/environment/wastetreatment.htm>
- [15]. OECD, (2007)., Total Amount Generated of Municipal Waste. Environmental and Social Statistic. Organization for Economic Co-operation and Development Economic. Available from: <http://www.oecd.com> (accessed 14.12.11).
- [16]. EUROSTAT, (2005)., Waste generated and treated in Europe. Detailed tables: Data 1995–2003. Statistical Office of the European Communities. European Communities, Luxembourg.
- [17]. IBGE, (2011), b. Atlas de Saneamento. Fundação Instituto Brasileiro de Geografia e Estatística. Available from: [http://www.ibge.gov.br/home/estatistica/populacao/atlas\\_saneamento/default\\_zip.shtm](http://www.ibge.gov.br/home/estatistica/populacao/atlas_saneamento/default_zip.shtm) . (accessed 13.12.11).
- [18]. Gupta, S., Mohan, K., Prasad, R., Gupta, S., Kansal, A., (1998), Solid waste management in India: options and opportunities. *Resources, Conservation and Recycling* 24 (2), 115–137.
- [19]. Shannigrahi, A.S., Chatterjee, N., Olaniya, M.S., (1997)., Physico-chemical characteristics of municipal solid wastes in mega city. *Indian Journal of Environmental Protection* 17 (7), 527–529.
- [20]. Jalan, R.K., Srivastava, V.K., (1995)., Incineration, land pollution control alternative – design considerations and its relevance for India. *Indian Journal of Environmental Protection* 15 (12), 909–913.
- [21]. Jha, A.K., Sharma, C., Singh, N., Ramesh, R., Purvaja, R. and Gupta (2008)., Greenhouse gas emissions from municipal solid waste management in Indian mega-cities: A case study of Chennai landfill sites., *Chemosphere* 71 , 4119–4130
- [22]. Reddy, S., Galab, S. (1998)., An Integrated Economic and Environmental Assessment of Solid Waste Management in India – the Case of Hyderabad, India.
- [23]. Sharholly M., Ahmad K., Mahmood G., Trivedi R.C., (2008)., ‘Municipal solid waste management in Indian cities – A review’ *Waste Management* 28 , 459–467.
- [24]. United Nations Department of Economic and Social Affairs (2010) Trends in solid waste management: issues, challenges, and opportunities, International Consultative Meeting on Expanding Waste Management Services in Developing Countries (Final Draft), 18-19 March 2010, Tokyo, Japan.
- [25]. Ibid.
- [26]. Bhide A.D and Sundaresan B.B (2001), “ Solid waste management – collection, processing and Disposal”, Mudrashilpa Offset Printers, Nagpur
- [27]. The functions that are relevant to the informal sector in solid waste management are entry 6: public health, sanitation conservancy and solid waste management; entry 8: protection of environment; entry 9: safeguarding the interests of weaker sections of society; and entry 11: urban poverty alleviation.
- [28]. M.P. Jain, *Indian Constitutional Law*, 5th ed. Reprint (2006), Wadhwa (Nagpur).
- [29]. Improving Municipal Solid Waste Management in India, World Bank Institute, Current Situation in Indian Cities and Legal Framework, (2008), Pg. 11, [http://www.tn.gov.in/cma/swm\\_in\\_india.pdf](http://www.tn.gov.in/cma/swm_in_india.pdf)

- [30]. Dr. Burman's committee was appointed by the Supreme Court to review all aspects of solid-waste management.
- [31]. Kailash Thakur (2005)., *Environmental Protection Law and Policy in India*, Deep & Deep Publications Pvt. Ltd. (New Delhi), 1st ed. Reprint
- [32]. Chapter X of the Criminal Procedure Code.
- [33]. AIR 1980 SC 1622
- [34]. Kailash Thakur (2005)., *Environmental Protection Law and Policy in India*, Deep & Deep Publications Pvt. Ltd. (New Delhi), 1st ed. Reprint
- [35]. P. Leelakrishnan (2004), *Environmental Law Case Book*, Lexis Nexis Butterworths (Delhi)
- [36]. Shekdar A V, Krshnawamy K N, Tikekar V G and Bhide A D (1992), "Indian Urban Solid Waste Management Systems Jaded Systems in Need of Resource Augmentation", *Journal of Waste Management*, Vol. 12, No. 4, pp. 379-387.
- [37]. See <http://www.environment.delhigovt.nic.in/ppt/legislation.pdf>
- [38]. Indrani Chandrasekar (2002) "Policy and prospects on Municipal solid Wastes", Workshop on Municipal Solid Waste in India, IIT Delhi, 4 May 2002.
- [39]. AIR 1981 Raj 121.
- [40]. 1996 SCC (2) 594.
- [41]. 1995 (2) SCC 577.
- [42]. (1998)2 SCC 416.
- [43]. AIR 2002 SC 40.
- [44]. (2002) 4 SCC 378.