

PASSIVELY UNRESPONSIVE WASTE MANAGEMENT IN INDIA
(India recent trends- environment pollution)¹

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PASSIVELY UNRESPONSIVE

Under the new leadership, India has undertaken dynamic exponential economic and cultural growth and change. It has recently become one of the fastest growing economies promising growth to its foreign investors who are outpouring in numbers in every economic sector.

India is reeling under severe environmental challenges, which have a promising and persistent future growth on evaluating our current systems of waste segregation and treatment. India cannot cope with current statistics of growing urban and industrial numbers and the corresponding waste generation.

The purpose of this paper is to understand the lacuna of Indian legislation in matters of waste. It analyses different segments of waste, its challenges, opportunities and corresponding management practices taken up by government institutions. Furthermore, it also draws comparative analyses of waste management system of some other countries along with providing policy suggestions. The paper suggests improvised technological methods for the easier processing of waste. Lastly, the paper includes opinions of experts.

DELHI- A CASE ANALYSIS

At east Delhi's Ghazipur landfill site, fifty tons of trash crashed down the 16-story high mountain of waste. Heaps of waste fell into the canal next to the garbage stack². The state government chief minister responded by engrossing in a blame game with the municipal corporation while blamed lack of land as a technical problem and blamed back the government for it. This caused the life of two people. According to the reports, the landfill has reached its exhaustion level in 2002, having crossed the permitted height of 20 metres reaching up to 50 metres. Alarmingly the civic bodies have failed even to initiate the process of separation of

² Somreet Bhattacharya, Pankhuri Yadav, *Two killed as 50 tonnes of waste hurtles down Ghazipur landfill*, Times of India, September 2, 2017.

garbage. Moreover, they have not even set up a mechanism for properly collecting municipal waste from the entire site. Around 2200, 2500, 2200 MT of waste is being dumped in the Ghazipur landfill, Okhla, Bhalswa daily. All of these sites have reached their exhaustion level and as an alternative to these, the Narela-Bawana is being used for dumping 1300 MT of waste daily. The municipal corporation is just introducing new landfill sites to dump unsegregated waste. However the main disturbing issue of lack of decentralisation of waste management and an effective structured waste treatment industry persists. Due to mixing up of waste, toxic gases and fuels cause disruptions. Collection and segregation of waste is still not conducted in every area of the capital. To further the mockery of burden of the failure and mismanagement of the municipalities, central government and national authorities such as the NHAI and CRRI³, wary of the repercussions and aware of the strong possibility of failure, want to be indemnified for the latest experiment that that wish to pursue of using inert waste from over-exhausted landfills as a material for road building and construction purposes.

The central government in co-ordination and co-operation with the state government and other authorities is responsible for preventing and controlling environmental pollution and laying down procedure for a structured waste management system.⁴ It is the sole responsible authority for the mismanagement and inadequate infrastructure and regulations governing waste segregation and management.

The planning commission has in its report suggested an integrated municipal solid waste management system, which included all essential activities like segregation, transport, storage, and process and disposal however; nothing to that effect has been accomplished yet.⁵

In case of *M C Mehta v Union of India*⁶ regarding the CNG Vehicles in Delhi, state government had failed to comply with old Supreme Court order of phasing out non- CNG buses. Under article 48A and section 29 (e) of the Air (Prevention and Control of Pollution) Act, 1981, government had a constitutional mandate to prioritize public health over profits to companies. Government however failed to implement precautionary principle. It was held that state government and the statutory authorities must anticipate, prevent and attack the causes of

³ Times of India, September 13,2017.

⁴ The Environment Protection Act, §3, (1986)

⁵ Planning Commission, *Report of the Task Force on Waste to Energy*, (October 2, 2019, 23:21), http://planningcommission.nic.in/reports/genrep/rep_wte1205.pdf

⁶ 2 SCC 353 (1991)

environmental degradation⁷. Supreme Court directed the government to phase out non- CNG buses within 8 months.

Delhi has seen the worst years in terms of air pollution in 2016 – 2017 yet nobody has filed a single case for violating the Air (Prevention and Control of Pollution) Act, 1981 which clearly reflect the gaps in enforcement of environment laws in the country. The State Pollution Control has been statutorily granted policing authority yet no action has till date been taken besides issuing of warnings refraining people from violating Air (Prevention and Control of Pollution) Act, 1981. This highlights a serious enforcement issue, which the government has been reluctant in enforcing. This pollution has severe effects, for instance particles such as polycyclic aromatic hydrocarbons can enter the blood stream and damage the brain. Other particles such as magnetite can cause neurodegenerative diseases. Minute toxic particles can cause respiratory problems, weaker immune systems and other severe diseases. Delhi's average air quality levels are recorded at four times the safe standard of 60-100 micrograms per cubic meter. An RTI application filed recently revealed that the Delhi government, CPCB and Delhi pollution control committee has collected Rs. 787 crores as green cess of which only Rs.93 lakhs has been spent. The government has failed to ensure the most appropriate method for optimum utilisation of the funds collected and has failed to do justice by the Air Act and Environment Protection Act. The Environment Protection rules 1986 was amended in 2015 and had a set deadline of implementation of December 2017 for stricter emission norms however, this has been further delayed recently due to lack of space for pollution control equipment and high costs. These amended norms aimed to cut the coal based power plant pollutants along with setting the limit of water usage in thermal plant.

CHALLENGES FACED BY INDIA IN WASTE MANAGEMENT

India follows a flawed system of waste disposal. Of the total waste that is generated, only a portion of it is being collected on regular basis. Of the total collected waste a fraction of it is sent to treatment plants and the rest is just dumped in over-exhausted and untreated landfills. Efficient waste management can only be ensured by proper segregation of different streams of waste after waste collection followed by treatment of the categorically segregated waste material differently. There is lack of systematic decentralized structure of waste collection and

⁷ Thushara Ullas, *sustainable development: a harmonious concept between environment and development*,

segregation, which is the biggest challenge in Indian waste management structure. This is coupled with lack of funding. The budgetary allocation barely provides for transportation of majority portion of waste not all. This leaves no budget for segregation and treatment.

The municipal and state authorities do have a separate complaint tribunal along with a dispute resolution tribunal. Law is skirted around and regulations evaded because of the complex hierarchy of bureaucracy coupled with lack of transparency in public dealings. Absence of a nationwide monitoring mechanism of a uniform code of the waste management plants results in faulty systems. The State Pollution Control Board's files and records have not to complete extent been digitized. There is also a lack of auditing of environmental firms and risk assessment activities.

SOLID WASTE

Waste collection and transportation is considered a major challenge in many cities in India and this can be overcome by mandatory invigilation of workers, strict policy implementation in municipal level thereby creating more jobs and further avoid burning of waste. There is no denial that new advanced and more efficient facilities need to be provided for better solid waste management. This would substantially and significantly reduce the amount of waste that is dumped untreated in landfills and the amount of waste that is burned out in open. It is important to institute waste treatment plants to safeguard our environment for example prevent air pollution, soil and water pollution and public health. The dumping and burning of solid waste in open has contributed thousand tonnes of units of air pollution. Continuous burning of waste produces methane, which can cause explosions and release of unwanted particles in air. Furthermore, it becomes a breeding ground for mosquitoes, bacteria and other pollutants, which affects the water sources.

It is observed that there are a few popular technologies and process currently being advocated for solid waste management, two of which can be broadly classified into categories of biochemical conversion, which includes composting and bio-methanation, and thermal processing of solid waste which includes gasification and burning among other things.

The planning commission has suggested a combination of below mentioned waste management processes like Biomethanation for wet biodegradable waste, microbial mechanised vermi-

composting for wet biodegradable waste, preparation of RDF from combustible waste, incineration, pyrolysis and plastic waste for fuel oil.⁸

Capping and rehabilitation of abandoned landfills should be made a priority especially in cities where the population is large hence resulting in a larger output of waste. Assessment of contamination of soil, water and surroundings must be assessed and evaluated to initiate a minimal damage rectification plan. Remediating uncapped and scattered piles of waste has a devastating and long-term effect on environment at large.

Inert collected from the drains or streets should be transported separately. Various new process convert this waste into usable energy. This segregation would help yield more output while employing waste to energy techniques between inert and highly moist waste produces. Gasification, pyrolysis and incineration are some examples of processes that yield energy in terms of fuel and electricity from waste. These strategies can help in bringing down our dependence on open landfills and burning of waste. This also promotes recycling and reusing waste products to generate clean energy there by making the economy more efficient. Constant research and advancement in technology would go a long way in making these alternatives more efficient and economically viable alternatives. Ensuring the waste composition at the time of segregation is very important for such strategies to be able to generate usable energy.

As a strategy, it would be very effective to make mandatory collection of waste in four separate categories, biodegradable, non-biodegradable, inert waste from the drains and sewage and other waste like construction material.

Plastic waste contributes nearly ten thousand tonnes per day according to the Central Pollution Control Board report. The recyclable plastics, which are the thermoplastics, are not much of an issue if proper segregation a waste collection strategies are applied however, the non-recyclable plastics, which commonly contain alkyd, epoxy, ester, melamine formaldehyde, phenolic formaldehyde, silicon, urea formaldehyde and polyurethane,⁹ can cause severe environmental hazards if not managed properly.

The policy regarding the manufacturing and recycling of plastic are very strict and straightforward. The report states that no person or institution shall manufacture plastic in any

⁸ *Supra* note 4.

⁹ <http://www.cpcb.nic.in/139-144.pdf>

dimensions unless it is in accordance with the regulations of the SPCB for states and PCC for union territories.

However, the hardship is faced in collection, segregation and transportation and the report of the Central Pollution and Control Board clearly states that the Deputy Commissioner or the District Collector of the concerned district is the responsible authority. We need to lay special emphasis on tertiary plastic recycling procedures that produce chemicals and other fuels from waste plastic based on different categories of segregation. The concerned authority should be held responsible for the plastic waste that is lying around. He is to be held accountable for all the plastic that gets burnt with other waste causing serious concerns of environment pollution due to lack in segregation and proper disposal mechanism. There are also some processes that come under the category of quaternary recycling of plastic waste where in energy content of the waste plastic is retrieved by mechanical processes such as incineration.

WASTE TO ENERGY GENERATION

Rapid economic and commercial growth in India mandates and implores the demand of uninterrupted power supply. With the ever-growing numbers of population coupled with the growing environmental concerns, renewable and environment friendly energy generation options need to be explored instead of conventional methods. A well-structured waste management plan infused with advanced technology and required skillset can tap the potential of generating energy from disposed waste to meet the growing demand of the country.

Solid waste can be categorised into four major categories namely, biodegradable, combustible, Construction and demolition wastes and inert waste.

Biodegradable are treated through bio-chemical conversions by composting and bio-methanation. Composting produces fertilizers while bio methanation can be further categorised into anaerobic digestion, biogas and thermal energy. Composting is an enzyme rich anaerobic process to convert the biodegradable waste into minerals and nutrients for soil. Bio-methanation can extract the energy in the process of conversion of biodegradable waste into soil nutrients. As per the Municipal Solid Waste Rules 2000 biodegradables cannot be landfilled to prevent combustible methane gas collection yet the reports earlier mentioned have verified that frequent fires have erupted in the mountain of waste at east Delhi's Ghazipur

landfill site due to methane being trapped in heaps of garbage. This is again a wrongdoing of the civic bodies and administrative authorities for which no action has been taken.

Combustibles are converted into viable energy forms through thermal process like pyrolysis, gasification and incineration. Pyrolysis and gasification furthered by means of steam turbines can generate electricity. Process of pyrolysis is used to heat and break down polymers to produce hydrocarbons, hydrogen and other gases in the absence of oxygen. Low-temperature pyrolysis can produce a liquid fuel from plastic and polymeric wastes. Pyrolysis leaves a beneficial byproduct called “carbon black.” This can be used as catalyst and can be used to absorb carbon dioxide and other emissions from coal-fired power plants there by reducing the toxicity of air pollutants constantly being emitted in the choking environment. Gasification process has a small alteration in the terms that it uses oxygen in small quantities and can be used in turbine generators. It helps biomass convert into energy. The large volumes of high temperature gas can help in electricity generation, as an alternative environment friendly fuel, or in chemical industry. The process of complete combustion alternatively known as incineration is used to reduce large volumes of waste and utilize the high temperature through turbines to generate energy as thermal or electricity. This process counter productively generates large amounts of carbon dioxide in the environment. Refuse derived fuel (RDF) is another process which involves removing the inorganic material and moisture of waste and using it to fuel turbines and generate electricity. In order to accelerate the energy output, organic matter like biomass and other biodegradable waste can be added which will fasten the process of burning.

Current policy structure implemented and practiced by the government does not guarantee performance of any of the currently in play waste processing technologies.

Regulations on optimization of application of technology in proportion to the quantity of waste is absent. A lack of staff is well qualified and trained to work in such institutions. The government has not weighed the requirement of developing processing field and sanitised landfills. The regulating state and central authorities are not completely aware of the benefits of an integrated waste management plan moreover they lack in interstate and intra state coordination. The SPCBs and PCCs do not have adequate infrastructure, monitoring authority and funds to overlook the work they are responsible for.

POLICY SUGGESTIONS FOR INTEGRATED SUSTAINABLE WASTE MANAGEMENT SYSTEM

According to the Planning Commission report, the government has suggested a decentralised mechanism for collection, segregation and transportation and a centralised institution for process like incineration, pyrolysis, gasification, RDF production, mechanical composting C&D waste processing and managing landfills.¹⁰

1. To lighten the burden of transportation cost and collection cost, municipal authorities should introduce a mechanism to utilize biodegradable waste.
2. Public private partnerships may encourage rapid development of infrastructure and processing plants. A regulation might be brought to facilitate and monitor strict participation between and public and private players. This can also promote advancement and sophistication in technology while strengthening partnerships and benefits. Escrow account can be created to ensure swift and default-less payment by government and other administrative institutions.
3. Roles of the municipal, state and central authorities should be clearly defined to bring absolute accountability and defined authority. The municipal and state authorities should also have a separate complaint resolving tribunal along with a dispute resolution tribunal.
4. There should be a national plan about different kind of waste and its management systems including policies for its processing. Every state should in furtherance of the national plan by the central government, formulate its own plan to manage municipal and water waste. It should analyses the funding requirement for every constituency and provides tools and transportation.
5. There should be a governing body that independently assess the working of state governments and private investors in public private partnerships. A commissioner shall be appointed to monitor adherence to the regulations and environment policies.
6. There should be a structured framework for promoting recycling with designated standards according to the report passed by the planning commission along with special emphasis on research and development on alternative fuel generation methods from non-biodegradable waste.

¹⁰ *Supra* note 4

7. Concerning solid waste burning, the government should make local police and municipal officers liable for non-collection of waste and open dumping. 100% capacity utilization of all plants should be ensured and revised. The emission rates and maintenance of treatment plants should be monitored. Penalties should be imposed for construction related pollution and waste.
8. Concerning the coal and fly ash (generated from incineration), the government should dispose it by using it in brick making industry. Wet scrubbers and electricity precipitators should be made mandatory in all coal using plants. Gas and other renewable energy generation should be subsidized while using coal for energy generation should invoke a higher tax.

There may be various practical problems emerging while implementing these rules. The environment law is spread over various acts, some of which have been discussed above. These acts require separate authorization from separate tribunals. Although it would be easier to comply with a unified legislation and a single window for license however, the elaborate and separate structures address different categories of environmental concerns.

1. Often noted practice of resorting to payments to facilitate permits and renewal of permits is a major loophole that evades the entire legislative framework and responsibility. This should be rectified with strict mandatory regulations for permits checked by another central authority. Although this may further add the delay in getting of permits but it helps maintain safety measures and ensures that institutions adhere to the regulations.
2. Absence of a nationwide monitoring mechanism of a uniform code of the waste management plants results in faulty systems.
3. Adding onto this, the State Pollution Control Board's files and records have not to complete extent been digitized.
4. There is also a lack of auditing of environmental firms and risk assessment activities.
5. Penalty for breach of regulation should involve heavy penalty in terms of fines and criminal liability.

All these disadvantages and hindrances invoke a sense of skepticism in the investor wanting to develop treatment and recycling plants hence resulting in weakening of the waste management setups in the country.

POLICY FRAMEWORK FOR INSTITUTION OF INTEGRATED WASTE DISPOSAL SYSTEM

Synchronization of various procedures and principles is called an integrated waste disposal system. It includes all of the following steps consolidated into one harmonious system. Segregation and separation into distinct streams of waste.

Introducing technological option and procedures, which are economically viable, environmentally safe and help in reducing the amount of waste ending up in landfills. Increasing maximum output of energy thereby ensuring better health of citizens and a safer and cleaner environment.

Combination of central, state and municipal authorities in setting up waste streams and disposal mechanisms and treatment plants. Constant tracking and monitoring of authorities about collection, segregation, transportation and disposal. Focuses on recovering the energy and remanufacture from reusing and recycling. The recycling industry plays a prominent role in segregation and storage of reusable products.

DECARBONISING ENERGY- NEW TECHNOLOGIES

Nature of energy supply is changing at a rapid rate. It is imperative that we shift our Conant dependence from coal the major source of energy generation and look for de-carbonising energy resources. Today as conventional forms of energy are fast moving towards extinction as well as are contributing generously to global concerns like the greenhouse effect there is a growing effort to employ various methods aimed to compress and dispose waste, while attempting the generation of energy from it.

1. Scientist are making diesel from water and carbon dioxide to cut dangerous particulate emission from cars and factories. In this process, hydrogen is taken from water and combined with carbon dioxide to produce hydrocarbons. These hydrocarbons are then separated to produce synthetic diesel. Diesel particulate pollution causes death of hundreds of thousands of people. This new clean diesel energy improves public health.
2. Nuclear energy is the key alternative to our dependence on coal. Uncertainty about future landscape of nuclear energy is due to lack of relevant knowledge coupled with required

skill in private industry. Furthermore, this long-term investment requires drastic policy amendments and support from the government. There is little doubt that nuclear technology has the potential to radically increase efficiency in clean energy generation and ultimately reduce environmental waste. Fusion reactors have substantially increased energy output in few of the countries where it has been installed.

3. Plasma Pyrolysis technology- Combination of thermodynamic properties to generate large amount of heat to dispose of any quantity and quality of plastic. A detailed and well-established segregation procedure is necessary, as the high temperature does not discriminate if fed different types of plastics.
4. Pyrolysis and other means to generate fuels from plastic- The process involves depolymerization of plastics into fuel with the help of a chemical catalyst to further the chemical reaction.

Waste plastics, which can be used as a fuel, can be heated and transformed into liquid vapour form. The gas is produced that is not used owing to absence of understanding and storage of diesel-generator fuel set for electricity generation.

5. Polymer coated roads- This project involves coating of a specific chemical orientation of polymer over roads, which results in reduced unevenness, long durability and increased binding strength.

CONCLUSION

Regulators are increasingly focusing on the need for a sustainable setting, as demonstrated by the new Companies Act, which requires certain businesses to carry out operations involving corporate social responsibility, including environmental growth. In order to prevent adverse effects such as revocation of authorization or prosecution, this is recommended for a period of time and it is also advisable that periodic internal audits and checks are conducted for identifying non-compliances and addressing them efficiently. Further, compliance with applicable environmental laws works to build brand image and product value, for acting in an environmentally responsible manner. Long term waste management plans need to be developed. Waste management contracts should be strictly adhered to. Adequate land and facilities by the government should be provided to boost public private partnerships. This would in turn bring in rapid growth, development and investment in the sector. The current financial spending on waste management initiatives and plans needs to be reviewed in light of

establishing proper institutions for waste disposal. The infrastructure of the present disposal and treatment plants is inadequate. Lack of responsibility complimented with lack of awareness has lead the country to such underdeveloped waste management structure and sustainable energy sector. These innovative initiatives must be pushed to extract maximum value. India needs to improve on policy framework surrounding waste management with a selection of appropriately trained people.