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WASTE MANAGEMENT

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Waste management is the collection, transport, processing, recycling or disposal, and monitoring of waste materials. Concern over environment is being seen a massive increase in recycling globally which has grown to be an important part of modern civilization. The consumption habits of modern lifestyles are causing a huge global waste problem. Industrialization and economic growth has produced more amounts of waste, including hazardous and toxic wastes. There is a growing realization of the negative impacts that wastes have had on the local environment (air, water, land, human health etc.)Waste management is the collection of all thrown away materials in order to recycle them and as a result decrease their effects on our health, our surroundings and the environment and enhance the quality of life. Waste management practices differ for developed and developing nations, for urban and rural areas, and for residential and industrial producers. Waste Management flows in a cycle: monitoring, collection, transportation, processing, disposal or recycle. Through these steps we can effectively and responsibly manage waste output and their positive effect they have on the environment.

Swatch Bharat Mission: The Swatch Bharat Mission was launched in our country the main objectives of the mission include recycling of solid waste, modern and scientific solid waste management, regarding healthy sanitation practices, Green and Blue bucket challenge, separation of dry and wet solid waste.

Liquid Waste Management; It includes procedures and practices to prevent discharge of pollutants to the drain system as a result the creation ,collection and disposal of non-hazardous liquid waste.

Water Conservation; Rainwater harvesting is the gathering and collection of water from the rooftop. The traditional method of rain water harvesting is the most effective and simple way to conserve the water. It means utilization of rain water for the domestic as well as agricultural purposes. There are three technical methods of rain water harvesting such as [1] Catchment, [2] Conveyance [3] storage.

E-Waste management; Managing e-waste encompasses not just the disposal or recycling, but also the pre-disposal logistics involved in collecting and transporting the waste. It also includes strategies for reducing the total waste generated, in line with the 3R principle - 'Reduce, Reuse and Recycle'. Organized management of e-waste is necessary because of several reasons.

Key words; Hazardous waste; Swatch Bharatmission; Liquid waste management-waste management, Water conservation.

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I. INTRODUCTION

India is facing an ever increasing challenge of providing for the incremental infrastructural needs of a growing urban population. According to the 2011 census, the population of India was 1.21 billion; of this 31% live in cities. It is further projected that by 2050 half of India's population will live in cities. With this increasing population, management of Municipal Solid Waste (MSW) in the country has emerged as a severe problem not only because of the environmental and aesthetic concerns but also because of the sheer quantities generated every day. According to Central Pollution Control Board 1, 27,486 TPD (Tons per day) of Municipal Solid Waste was generated in India during 2011-12, with an average waste generation of 0.11 kg/ capita/day. Of the total waste generated, approximately 89,334 TPD (70%) of MSW was collected and only 15,881 TPD (12.45%) was processed or treated. Segregation at source, collection, transportation, treatment and scientific disposal of waste was largely insufficient leading to degradation of the environment and poor quality of life.

Basic principles of Solid Waste Management 1) 4Rs: Refuse, Reduce, Reuse & Recycle • Refuse: Do not buy anything which we do not really need. • Reduce - Reduce the amount of garbage generated. Alter our lifestyle so that minimum garbage is generated. • Reuse - Reuse everything to its maximum after properly cleaning it. Make secondary use of different articles. • Recycle – Keep things which can be recycled to be given to rag pickers or waste pickers (Kabadiwallahs).Convert the recyclable garbage into manures or other useful products.

2) Segregation at source: Store organic or biodegradable and inorganic or non biodegradable solid waste in different bins. Recycle of all the components with minimum labor and cost.

3) Different treatments for different types of solid wastes: One must apply the techniques which are suitable to the given type of garbage. For example the technique suitable for general market waste may not be suitable for slaughter house waste.

4) Treatment at nearest possible point: The solid waste should be treated in as decentralized manner as possible. The garbage generated should be treated preferably at the site of generation i.e. every house.

II. MODERN INTEGRATED MUNICIPAL SOLID WASTE MANAGEMENT: CONCEPTS & BENEFITS

At source reduction and reuse at source: The most preferred option for waste management is to prevent the generation of waste at various stages including at product design stage, production, packaging, use and reuse stages of a product. Waste prevention helps reduce handling, treatment, and disposal costs and reduces various environmental impacts such as air emissions and generation of greenhouse gases.

Waste recycling: Recovery of recyclable material resources through a process of segregation, collection and re-processing to create new products is the next preferred alternative. z

Waste to composting: The organic fraction of waste can be composted to improve soil health and agricultural production adhering to FCO norms. Z

Waste-to-Energy: Where material recovery from waste is not possible, energy recovery from waste through production of heat, electricity, or fuel is preferred. Biomethanation, waste incineration, production of Refuse

Derived Fuel (RDF) and co processing of the sorted dry rejects from MSW in cement kilns are commonly adopted "Waste to Energy" technologies.

Waste Disposal: Remaining residual wastes at the end of the hierarchy, which are ideally comprised of inerts, are to be disposed in sanitary, lined landfills, which are constructed in accordance with stipulations of the MSW Management and Handling Rules, 2014. The hierarchy implies that all options of waste minimization

the 3R approach (Reduce, Reuse, and Recycle), which is also aimed at optimizing the management of municipal solid waste from all the waste-generators (households, commercial and institutional establishments, parks and gardens , construction and demolition activities, urban agriculture, safety and healthcare facilities) and involving all the stakeholders (waste generators, service providers, informal sector, regulators, government, and community/neighborhoods). The adoption of the 3R concept helps to minimize the amount of waste to be handled by the municipal authority minimizing the public health and environmental risks associated with it..It should be exercised before treatment and disposal technologies are selected and implement.

III. WASTE MANAGEMENT SYSTEM IN INDIA

Waste management market comprises of four segments - Municipal Waste[wet and dry waste] Industrial Waste, Bio- Medical Waste and Electronic Waste . All these four types of waste are governed by different laws and policies as is the nature of the waste. In India waste management practice depend upon actual waste generation, primary storage, primary collection, secondary collection and transportation, recycling activity, Treatment and disposal. In India, municipality corporations play very important role in waste management in each city along with public health department. Municipal Corporation is responsible for the management of the MSW generated in the city, among its other duties. The public health department is responsible for sanitation, street cleansing, epidemic control and food adulteration. There is a clear and strong hierarchy of posts in the Municipal Corporation. The highest authority of Municipal Corporation rests with the Mayor, who is elected to the post for tenure of five years. Under the Mayor, there is a City Commissioner. Under the city commissioner, there is Executive Officer who supervises various departments such as public health, water works, public works, house tax, lights, projection tax, demand and a workshop, which, in turn, all are headed by their own department heads.

The staff in the Public health department is as follows: Health officer, Chief sanitary and food inspector, Sanitary and food inspectors, Sanitary supervisor, Sweepers, etc. The entire operation of solid waste management (SWM) system is performed under four headings, namely, street cleansing, collection, transportation and disposal. The cleansing and collection operations are conducted by the public health department of city Municipality Corporation, while transportation and disposal of waste are carried out by the transportation department of city Municipality Corporation. The entire city can be divided in to different zones. These zones are further divided into different sanitary wards for the purpose of solid waste collection and transport operations. Currently waste management in India mostly means a picking up waste from residential and industrial areas and dumping it at landfill sites. The authorities, usually municipal, are obligated to handle

solid waste generated within their respective boundaries; the usual practice followed is of lifting solid waste from the point of generation and hauling to distant places known as dumping grounds and/or landfill sites for discarding. The treatment given to waste once thus emptied is restricted to spreading the heap over larger space so as to take away the waste from the public gaze. Waste collection is usually done on a contract basis. In most cities it is done by rag pickers, small- time contractors and municipalities.

IV. WASTE MANAGEMENT INITIATIVES IN INDIA

During the recent past, the management of solid waste has received considerable attention from the Central and State Governments and local (municipal) authorities in India. A number of partnerships/alliances are found to exist in the field of solid waste management in Indian cities. These alliances are public-private, community-public and private-private arrangements. To identify the status of existing alliances in the study area, it is first necessary to identify the various actors working in the field of waste management.

These can be grouped as under:

• Public sector: this comprises of local authority and local public departments at city level;

• Private-formal sector: this constitutes large and small registered enterprises doing collection, transport, treatment, and disposal and recycling;

• Private-informal sector: this constitutes the small-scale, non recognized private sector and comprises of waste-pickers, dump pickers, itinerant-waste buyers, traders and non-registered small-scale enterprises; and

• Community representatives in the form of NGOs, etc. These actors enter into partnerships for providing various activities related to solid waste management. These partnerships can be as follows:

• Public-private (Local Authority and private enterprises);

• Public-community (Local Authority and NGOs); etc

• Private-private (waste-pickers, itinerant-waste buyers, waste traders and dealers, wholesalers, small scale and large scale recycling enterprises); and

• Public-private-community (Local Authority, private enterprises and NGOs). National Solid Waste Association of India (NSWAI) is the only leading professional non-profit organization in the field of Solid Waste Management including Toxic and Hazardous Waste and also Biomedical Waste in India. It was formed on January 25, 1996. NSWAI helps the Ministry of Environment and Forest (MoEF), New Delhi in various fields of solid waste management makes policies and action plans and is entrusted the responsibility of collecting information and various data related to solid waste management from the municipalities of Urban Class-I cities(population more than 1Lakh) and Urban Class-II cities(population above 50,000), collate and disseminate the information to website which is European Scientific Journal June 2015 /SPECIAL/ edition ISSN: 1857 – 7881 (Print) e - ISSN 1857- 7431 114 linked to national and international organizations. The association is a member of the International Solid Waste Association (ISWA), Copenhagen, Denmark and provides forum for exchange of information and expertise in the field of Solid Waste Management at the national and international level.

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V. CONCLUSION

It is suffice to say that we require a more stringent integrated and strategic waste prevention framework to effectively address wastage related issues. There is an urgent need to build upon existing systems instead of attempting to replace them blindly with models from developed countries. To prevent any epidemic and to make each city a healthy city-economically and environmentally, there is an urgent need for a well-defined strategic waste management plan and a strong implementation of the same in India. To achieve financial sustainability, socio-economic and environmental goals in the field of waste management, there is a need to systematically analyze the strengths and weaknesses of the community as well as the municipal corporation, based on which an effective waste management system can be evolved with the participation of various stakeholders in India. The public apathy can be altered by awareness building campaigns and educational measures. Sensitization of the community is also essential to achieve the above objectives and we need to act and act fast as every city in India is already a hotbed of many contagious diseases.

Here are a few tips to achieve this goal. Keep ourselves informed: It is important that we are in the know about what is happening on the environment front. Read about how untreated sewage is thrown into the rivers, attend public lectures about air pollution, & keep in touch with new policies that affect our environment. The more informed we are, the better equipped we are to fight such issues.

2. Consume less: Motto: Refuse…..Reduce….Reuse… Recycle .This means consuming fewer resources, reusing whatever we can and finally recycling what cannot be reused. This process greatly reduces the garbage.

3. Say 'No' to plastic bags: One of the biggest sources of pollution in Indian cities is the ubiquitous plastic bag. Refuse to accept one. Instead, carry a cloth shopping bag with us.

4. Separate our garbage: India has one of the world's most efficient recycling mechanisms. Use the service of our raddiwalla. Newspapers, bottle cans and other such recyclables can fetch us money and in the process we can help to save the environment. Rag pickers, too, perform a vital function for the city. Kitchen garbage (biodegradable) should be separated from non biodegradable waste.

5. Compost our organic waste: Start a vermi compost culture and organic compost. We can convince our neighbors to start a vermiculture and organic compost culture also to produce manure.

VI. VERMI COMPOSTING

Earthworms have been on the Earth for over 20 million years. In this time they have faithfully done their part to keep the cycle of life continuously moving. Their purpose is simple but very important. They are nature's way of recycling organic nutrients from dead tissues back to living organisms. Many have recognized the value of these worms. Ancient civilizations, including Greece and Egypt valued the role earthworms played in soil. The Egyptian Pharaoh, Cleopatra said, "Earthworms are sacred." She recognized the important role the worms played in fertilizing the Nile Valley croplands after annual floods. Charles Darwin was intrigued by the worms and studied them for 39 years. Referring to an earthworm, Darwin said, "It may be doubted whether there are many other animals in the world which have played so important a part in the history of the world." The earthworm is a natural resource of fertility and life. Earthworms live in the soil and feed on decaying organic material. After digestion, the undigested material moves through the alimentary canal of the earthworm, a thin layer of oil is deposited on the castings. This layer erodes over a period of 2 months. So although the plant nutrients are immediately available, they are slowly released to last longer. The process in the alimentary canal of the earthworm transforms organic waste to natural fertilizer. The chemical changes that organic wastes undergo include deodorizing and neutralizing. This means that the pH of the castings is 7 (neutral) and the castings are odorless. The worm castings also contain bacteria, so the process is continued in the soil, and microbiological activity is promoted.

Vermicomposting is the process of turning organic debris into worm castings. The worm castings are very important to the fertility of the soil. The castings contain high amounts of nitrogen, potassium, phosphorus, calcium, and magnesium. Castings contain: 5 times the available nitrogen, 7 times the available potash, and 1 ½ times more calcium than found in good topsoil. Several researchers have demonstrated that earthworm castings have excellent aeration, porosity, structure, drainage, and moisture-holding capacity. The content of the earthworm castings, along with the natural tillage by the worms burrowing action, enhances the permeability of water in the soil. Worm castings can hold close to nine times their weight in water. "Vermiconversion," or using earthworms to convert waste into soil additives, has been done on a relatively small scale for some time.

Vermicomposting is done on small and large scales. In the 1996 Summer Olympics in Sydney, Australia, the Australians used worms to take care of their tons and tons of waste. They then found that waste produced by the worms was could be very beneficial to their plants and soil. People in the U.S. have commercial vermicomposting facilities, where they raise worms and sell the castings that the worms produce. Then there are just people who own farms or even small gardens, and they may put earthworms into their compost heap, and then use that for fertilizer.

VII. VERMICOMPOST AND ITS UTILIZATION

Vermicompost is nothing but the excreta of earthworms, which is rich in humus and nutrients. We can rear earthworms artificially in a brick tank or near the stem / trunk of trees (specially horticultural trees). By feeding these earthworms with biomass and watching properly the food (bio-mass) of earthworms, we can produce the required quantities of vermicompost

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