

Methods Practices for Managing Solid Waste

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ABSTRACT: It is known that the waste being disposed of is used in a variety of ways. "The waste is gold if it is properly held. This paper discusses methods and practices for solid waste management in India. The management of solid waste is comprised of various types, such as industrial waste, agriculture, transport and municipal waste. Even though every type of waste is dangerous, it's municipal waste 'now known as solid waste' that can be properly managed without polluting other species and causing harm. The main focus of this paper is on urban solid waste. Different methods to manage solid waste from organic compost to energy generation have been described. India is the second most rapidly growing economy in the world and the world's second most populous country. There are around 852 million rural inhabitants and 325 million in urban areas.

KEYWORDS: Municipal Solid Waste, Organic Compost, Pollution, Recycling.

INTRODUCTION

They live here. The level of urbanization has risen in 2026 from 26.5% to 38% in 50-60 years and is expected to increase to 44% in 2026. Rapid industrialization and population explosion in India have brought people out of towns that generate thousands of tons of MSW a day. India has a sharp contrast between its growing population and services and resources available. Solid waste management (SWM) is one of the services that India has a huge gap. There are no proper municipal waste disposal systems (MSW) to deal with the burgeoning waste volume. The current service of SWM is inefficient, expends heavily and poses a potential threat to public health and quality of the environment. The people of India currently live in times of unprecedented economic growth, rising ambitions and rapidly changing lifestyles, increasing public health and environmental expectations [1]–[3].

Failure to fulfil these standards could lead to a poor quality of life. If the consequence of pollution is air, water or ground - long-term reduction in the state of a country in productivity y leading to deterioration. There is also an important aspect of sustainable growth that is controlling emissions in order to minimize risk of ill health, protect the natural resources and add to our quality of life. Big cities collect about 70-90 percent of MSW made, while less than 50 percent is provided by smaller cities and towns. In open terrain and dumps over 91% of the MSW collected officially is landfilled. The waste management hierarchy limits the uses of materials a d re to the ten environmental friendly. Source reduction starts with the processing of waste and reusing materials to avoid entrance into the waste stream. Thus, waste is not created until the "reuse" process is completed. Once waste is produced, it must be stored. The most productive means of managing waste is the resource recovery from waste in the form of recycling and compostion. The majority of MSW's produced in India end up inland fills due to technological and economic limits on recycling, product design, insufficient source separation and insufficient markets capable of using all sorted matter. In order to facilitate source isolation, municipal authorities should continue collaborating with their collaborators. As this is being introduced and recycled, steps should be taken to cope in future with unrecyclable waste [4]–[9].

Wastewater Management

1.1 Recycling:

The most successful approaches to avoid waste generation are minimizing and reusing. However, recycling requires a separate waste stream if the source is isolated or separated later after processing. However, the waste stream must be divided, whether the source is distributed or separated. The waste is obtained in a mixed form, and is called urban solid wastes because of weaknesses in the isolation of the source (MSW). It is hard to distinguish mixed waste. The manual cutting will then be recycled from paper, plastic, glass and metal. The separation of this materials from SW is extremely energy- and time-intensive and is not commonly done. Mixing of waste thus results in the processing, by voluntary means, of a fraction of the residues that cannot be recycled nor composted.

1.2 Aerobic composting: Similarly, source isolated, organic wastes can be recycled and collected compost can be used as organic wastes 4066 Trends in the areas of farming biosciences 10 fertilizer. Bio-compost is the abundant in plants of macro-nutrients such as nitrogen, phosphorus, potassium and others. Tinging mixed waste by aerobic composites results in compost polluted mostly heavy metals by organic and inorganic matter. Pollution by heavy metals in MSW Compost can affect public health and the environment, and contributes to

the restriction of agricultural use. Therefore, mixed waste composting is not an alternative for efficient waste management, but it is not a matter for the public. In countries like India where more than 91 percent of MSW is settled and there are no other options, mixed waste composting is commonly practiced and better considered.

Municipal Solid Waste Management

Under a fourth 5-year (1969–74) programme, the Government (GoI), by grants and loans to government governments to set up MSW composting facilities, initiated efforts to create better facilities for municipal and solid waste management (MSWM). In 1975, a high-level committee was formed by the GoI to investigate the issue of urban solid waste in India. It made 76 suggestions addressing 8 primary waste management sectors. Some are currently non-operational and the rest do not function in their entirety because of poor waste quality, poor equipment choice, poor maintenance, high manufacturing costs, financial losses, low priority at the highest level and poor promotion activities (Selvam, 1996). A review panel formed by GoI found that the needless and avoidable mechanization of the plant raised the cost of organic manure production, while the municipality's lack of sales promotion activities resulted in failure of these plants.

In 1990, the Ministry of Environment and forests (MoEF) established the National Waste Management Board (NWMC) with as its main purpose the urban management of solid waste (UNEP, 2001). In a report, the NWMC recommended 22 municipalities to estimate the recycled waste amount and the disposal fate of the waste. In 1993 NWMC was formed as a national task force for plastic waste management. Steps to mitigate the harmful effects of plastic recycling on the environment and health.

In any culture, solid waste management is a vital service. Let us begin with a discussion on the content being handled, though, before beginning the method – solid waste. Solid waste applies to the range of waste, originating from animal and human operations, which is dismissed as unnecessary and inefficient. Solid waste is produced in a given area and can be treated in a variety of ways from manufacturing, residential and commercial activities. Deposits are usually categorized as sanitary, urban, building and degradation sites and hazardous waste sites. Materials like plastic, paper, glass, metal, and organic waste may be classified as waste. Harmful potential, including nuclear, inflammable, viral, hazardous or not toxic waste can also be defined by the categorization. Categories may also refer, whether industrial, state, commercial, residential, building and demolition, to the sources of the waste.

Whatever the nature, substance or hazard potential of solid waste, better environmental practices should be routinely handled. As a vital element of public sanitation in terms of solid waste disposal, this must be used in environmental planning. Solid waste management is characterized as a discipline that best addresses all facets of public health, recycling, economical, aesthetical, and engineering and other environmental concerns, relating to control of production, storage, collection, transport, transmission, processing and disposal of solid waste materials. Solid waste management encompasses strategy, management, financing, infrastructure and legal roles. Solid waste management Solutions might encompass complex interdisciplinary connections between the areas of public health, urban and regional planning, political sciences, geography, economics, the environment, connectivity and conservation[10][4][1]. For residential and industrial farmers, urban and rural areas and developed and developing countries, solid waste management practices may vary. The city government agencies are responsible for the administration of non-hazardous waste in urban areas. In the other hand, it is normally the duty of those producing hazardous waste to handle them, according to state, national and, indeed, international authorities.

Solid waste management is the one thing just about every city government provides for its residents. While service levels, environmental impacts and costs vary dramatically, solid waste management is arguably the most important municipal service and serves as a prerequisite for other municipal action. As the world hurtles toward its urban future, the amount of municipal solid waste (MSW), one of the most important by-products of an urban lifestyle, is growing even faster than the rate of urbanization. Ten years ago there were 2.9 billion urban residents who generated about 0.64 kg of MSW per person per day (0.68 billion tonnes per year). This report estimates that today these amounts have increased to about 3 billion residents generating 1.2 kg per person per day (1.3 billion tonnes per year). By 2025 this will likely increase to 4.3 billion urban residents generating about 1.42 kg/capita/day of municipal solid waste (2.2 billion tonnes per year).

DISCUSSION

India is the second fastest growing economy and the world's second most populous region. Indian population is estimated to grow from 1029 million to 1400 million between 2001 and 2020, up by 36% at 26 percent annually by 1.2 percent (2001 Indian Census). Routine population of about 742 million lives in rural areas and 285 million

live in urban areas. The urbanization pace of the country grew from 17.6% to 28% in the last period .By 2026, 50 years and is expected to grow to 38%[11][5][2]. Solid waste management encompasses strategy, management, financing, infrastructure and legal roles. Solid waste management Solutions might encompass complex interdisciplinary connections between the areas of public health, urban and regional planning, political sciences, geography, economics, the environment, connectivity and conservation.

It is known that the waste which is thrown away can be used in many different ways. This paper deals with the solid waste management methods and practices in India. The solid waste management consists of various types of wastes like industrial, agricultural, transport, municipal etc. Although all types of wastes are harmful but municipal solid waste 'now known as Solid Waste' is the type of waste which can be managed properly without causing any pollution and harm to other species. In this paper the main focus is on municipal solid waste. Various methods have been described to manage the solid waste from organic compost making to energy generation.

India is the second fastest growing economy and the second most populated country in the world. Here, about 852 million people live in rural areas and 325 million live in urban areas. The level of urbanization of the country has increased from 26.5% to 38% in the least 50-60 years and is expected to rise to 44% by the year 2026 [1]. Rapid industrialization and population explosion in India has led to the migration of people from villages to cities, which generate thousands of tons of MSW daily. The MSW amount is expected to increase significantly in the near future as the country strives to attain an industrialized nation status by the year 2020 [2]. India is facing a sharp contrast between its increasing urban population and available services and resources. Solid waste management (SWM) is one such service where India has an enormous gap to fill. Proper municipal solid waste (MSW) disposal systems to address the burgeoning amount of wastes are absent. The current SWM services are inefficient, incur heavy expenditure and are so low as to be a potential threat to the public health and environment quality [3]. The present citizens of India are living in times of unprecedented economic growth, rising aspirations and rapidly changing lifestyles, which will raise the expectations on public health and quality of life. These expectations when not met might result in a low quality of life for the citizens. Pollution of whether air, water or land results in long- term reduction of productivity leading to a deterioration of economic condition of a country. 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. Big cities collect about 70-90% of MSW generated, whereas smaller cities and towns collect less than 50% of waste generated. More than 91% of the MSW collected formally is landfilled on open lands and dumps [5]. Open burning of MSW and landfill fires together releases 22,000 tons of pollutants into the lower atmosphere. The pollutants include Carbon Monoxide (CO), Carcinogenic Hydro carbons (HC) (includes dioxins and furans), Particulate Matter (PM), Nitrogen Oxides (NO) and Sulphur Dioxide (SO).

The hierarchy of waste management is reducing the use of materials and reusing them to be the most environmental friendly. Source reduction begins with reducing the amount of waste generated and reusing materials to prevent them from entering the waste stream [5]. Thus, waste is not generated until the end of "reuse" phase. Once the waste is generated, it needs to be collected. Material recovery from waste in the form of recycling and composting is recognized to be the most effective way of handling wastes. Due to technical and economic limitations of recycling; product design; inadequate source separation and lack of sufficient markets that can use all sorted materials, most of the MSW generated in India ends up in landfills. Local authorities should start working with their partners to promote source separation. While this is being achieved and recycling is increased, provisions should be made to handle the non-recyclable wastes that are and will be generated in the future.

Aerobic composting of mixed waste results in a compost contaminated by organic and inorganic materials, mainly heavy metals. Contamination of MSW compost by heavy metals can cause harm to public health and environment and is the major concern leading to its restricted agricultural use [8]. Mixed waste composting is therefore not an option for sustainable waste management, but this issue is not a part of public knowledge. Mixed waste composting is widely practiced and is considered better [9] in countries like India where more than 91% of MSW is landfilled and there are no other alternatives. Energy Recovery Energy recovery is a method of recovering the chemical energy in MSW. Chemical energy stored in wastes is a fraction of input energy expended in making those materials. Anaerobic Digestion : The USEPA defines Anaerobic digestion (AD) as a process where microorganisms break down organic materials, such as food scraps manure and sewage sludge in the absence of oxygen. In the context of SWM, anaerobic digestion (also called Anaerobic Composting or Biomethanation) is a method to treat source separated organic waste to recover energy in the form of biogas and compost in the form of a liquid residual. Biogas consists of methane and carbon dioxide and can be used as fuel

or by using a generator it can be converted to electricity on-site. The liquid slurry can be used as an organic fertilizer. Refuse Derived Fuel (RDF) : Refuse Derived Fuel refers to the segregated high calorific fraction of processed MSW. RDF can be defined as the final product from waste materials which have been processed to fulfill guideline, regulatory or industry specifications mainly to achieve a high calorific value to be useful as secondary/ substitute fuels in the solid fuel industry. RDF is mainly used as a substitute to coal in high energy industrial processes like power production, cement kilns, steel manufacturing etc, where RDF use can be optimized to enhance economic performance [10]. Waste To Energy Combustion (WTE) : Waste – to – Energy combustion (WTE) is defined as a process of controlled combustion, using an enclosed device to thermally breakdown combustible solid waste to an ash residue that contains little or no combustible material and that produces, electricity, steam or other energy as a result [11]. Even though both WTE combustion and RDF combust MSW, the objective of WTE combustion and RDF combust MSW, the objective of WTE combustion is treating MSW to reduce its volume. Generating energy and electricity only adds value to this process.

The present level of SWM service in urban areas is a potential threat to public health and environment [1]. Inhalation of bioaerosols and of smoke and fumes produced by open burning of waste can cause health problems. Also, the exposure to air-borne bacteria is infectious. Toxic materials present in solid waste are determinants for respiratory and dermatological problems, eye infections and low life expectancy [13]. The carbonaceous fractions and toxic elements like Pb, Cr, Zn etc dominate the fine particle range [5]. A less observed side effect of improper SWM in India is the introduction of heavy metals into the food chain. Compost from mixed waste composting plants is highly contaminated with heavy metals. Using this compost on agricultural fields will result in contamination of the agricultural soil with heavy metals. Heavy metals found in mixed waste composts are Zinc (Zn), Copper (Cu), Cadmium (Cd), Lead (Pb), Nickel (Ni) and Chromium (Cr).

Comparison of SWM in India with the hierarchy of sustainable waste management does not show a very bright situation. It indicates a developing country with a huge population and growing economy and scattered but ongoing efforts towards SWM. There is also a definite awareness among local bodies as well as policy makers on SWM. The SWM sector in India has progressed in the right direction during the last few years [12], specifically after the introduction of Jawaharlal Nehru National Urban Renewal Mission (JnNURM) by the Government of India (GOI). However, it still suffers due to lack of managerial and financial resources and public awareness on the issue. The sector has a long way to go.

Diseases caused due to stray animals, pests and insects attracted to wastes is a threat to public health too. Sewers and drains clogged by solid waste are breeding grounds for mosquitoes. Improper SWM in the city Surat caused city-wide bubonic plague epidemic in 1994, which later transformed Surat into one of the cleanest cities in India. Stray animals and insects carry other diseases like cholera and dengue fever [15].

CONCLUSION

The impact of inadequate waste management methods on human health and the environment were never more important with the growing population and the accelerated speed of urbanization. The study found that current policies and facilities are insufficient to cope with the huge amount of MSW generated by the city of Delhi. The condition will hit critical levels with an almost three-fold rise in the MSW generation by 2021. MCD and the Delhi Government have recognized that the situation is critical and have drawn up guidelines for the disposal and care of MSW for the State of Delhi in the form of a master plan (2005-2021).

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