Assessment on Waste Management and it's Impact on Environment in Kharar, SAS Nagar, Greater Mohali, Punjab, India

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Abstract : Considering increasing population, urbanization & unsafe disposal of waste, a survey was conducted to assess various waste management techniques and impact on public health & Environment in Kharar area, SAS Nagar, Greater Mohali, Punjab. Undoubtedly, increase in population & various anthropogenic activities simultaneously result in large amount of waste generation. The major sources of waste generation are household activities, agricultural activities, industrialization and urbanization. During this survey, it was found that collection and disposal of waste is not done regularly results in formation of waste/garbage mounds which ultimately becomes origin for common diseases carrying diverse impacts on human health and even emits foul odour; also causes destruction of aesthetic value of nature. Study has shown that people exposed to unsafe waste disposal have been suffering from various health issues. It is recommended that Solid Waste Management guidelines must be implemented & followed strictly to keep the city neat and clean. The survey was executed through field investigation of dumping sites or treatment plants and interaction with the worker of Kharar area and also with the local people through well-formulated questionnaire, to understand the various waste management facilities provided by Municipal Corporation of Kharar, individual participation in reducing the waste generation, problems faced by them and the impacts of waste on health and environment.

Index Terms: Waste Management, Solid Waste Generation, Public Health, Recycling, Sustainability.

I. INTRODUCTION

The combination of industrialization and the rapid increase in population and urbanization has greatly increased the generation of solid waste. This become serious issue for the growing or developing countries like India, in terms of poor health conditions, decrease in growth of economy and bad impacts on environment [1]. The waste generated whether in low amount or medium it cause serious threats to environment as well as for the health of human being and animals and destroys the beauty of the nature [2]. The increase in populations since 1990s contributes much of waste generation [3]. The demands of accurate management for the collection, storage, transportation and disposing of waste in landfills considering the impacts on environment, health conditions of citizens, and aesthetic values [4]. In India, waste is growing by leaps and bound, about 7.2 million tons of hazardous waste and 1 square kilometer of additional landfill area is found every year [5].

Widely used methods of disposing waste material are incineration and landfilling [6]. Amongst the states of north India, Punjab comprises of 163 Urban Local Bodies (ULB), and provides public facilities through private sector. Punjab is split into 8 groups that is (i) Jalandhar (ii) Ludhiana (iii)

Bathinda (iv) Ferozepur (v) Patiala (vi) Amritsar (vii) Pathankot and (viii) GMADA. GMADA in turns consist of 16 ULBs, which involves Mohali, located near the Chandigarh. This area still does not have waste management system or facilities [7].

The waste disposing sites are becoming shelters for the disease causing animals or flies like mosquitoes [8]. The reuse of the material can be attained at waste generation site instead on the disposed area [9] by the proper preparation and repairing of the waste material [10]. Solid waste material containing organic substances which on degeneracy results in the emission of harmful gases, leads to global warming [11]. Countries those are developed, manage the waste material through private management [12]. The reutilization of waste material whether it is eco-friendly or not, should be reduced and recycled [13]. In Ghana, city located in Africa, segregation of biodegradable and non-degradable waste material is done by pilot sorting technique, results are highly effective [14].

The recycling techniques are implemented in such a ways that the drastic effects of these waste is highly reduced [15]. The biomedical waste from hospitals and quarantine areas increase about 18-42% during COVID-19 pandemic. Concerning this situation, the new solid waste management strategies and policies are implemented, for the proper management and maintenance of biomedical waste [16]. IHR is facing the dreadful solid waste management practices of due to high number tourist visitors, waste from construction and other disposal material. The management policies are implemented by the authorities, which also involves the contribution from local people [17].

II. METHODS & METHODOLOGY

2.1. SELECTED AREA

The current research is carried in accordance to perceive the methods and techniques performed by Municipal Corporation (MC) of Kharar, for the management of waste generation. MC of the Kharar becomes the first area among Punjab, that leads to conversion of waste generated by the area into organic material by using advance technologies for the progress and development, which also becomes the source of income for various jobless people.

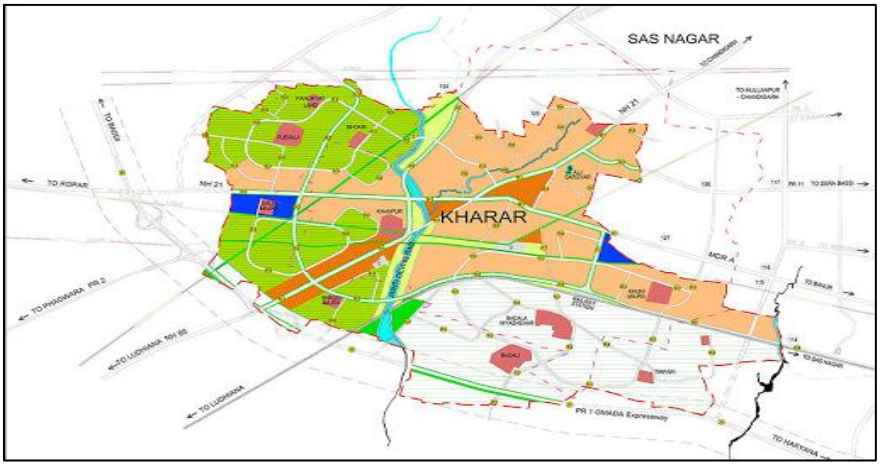

FIGURE 2.1: Google image showing map of Kharar, SAS NAGAR, Greater Mohali, Punjab, India

2.2 OBJECTIVES OF STUDY

Study was conducted to analyze procedures and methods used for waste management in Kharar area and to assess the impacts of waste generation on environment and human health. One of the objectives was to create awareness among the people about importance of 3R's and to understand their role as an individual.

2.3 METHODOLOGY

The methodology includes:

- Primary data was collected via
  i. Field survey
  ii. Interview of the residents
  iii. Information collected through Well-formulated questionnaires, through Google form.
- Secondary data was collected from literature review which comprises of official information (legal documents) and chronology.

The survey was conducted from Feb 2021 to May 2021.

2.3.1 FIELD SURVEY

Field survey comprises of qualitative method of collection of data, which involves interaction with people those near the study area. During the observation it is found that, there are open dumping site for the disposal of waste material, collection and transportation of waste from various wards by door to door is done through government waste management facilities. The collected waste material is then disposed off into the open dumping ground/yard (controlled tipping) situated at Darpan city comes under ward no.1 (Civil Hospital road-Kharar).

Open Dumping – Open dumping is a most common method for the disposal of waste material. Here, waste is dumped in open ground and is not covered by anything, it leads to open burning, ensures the breeding of harmful organisms and degrade the soil which results in soil/land pollution. Government has given 11 months of tender for the waste management. About 500-700 tons of waste is disposed per day annually up to 182,500-255,500 tons.

FIGURE 2.3.1: Open Dumping site at Darpan city (Kharar), SAS NAGAR, Greater Mohali, Punjab, India

The waste material from all over Kharar is collected and dumped in to the open dumping area, whether from roadside garbage, small dumping site in different localities, hospital and other areas.

FIGURE 2.3.2: Uncontrolled waste on roadsides in Kharar, SAS NAGAR, Greater Mohali, Punjab, India

Due to rise in urbanization and population, new projects are implemented for the establishment residential areas, construction of new roads, and so much other activities, which results in the generation of construction waste material, this ultimately degrade the soil and make the soil unfit for cultivation practices. Areas mostly having construction sites in Kharar are Shivalik city, Gillco valley, JTPL city, Highway plaza (situated at Landran road), Sunny enclave (Chandigarh road), Shivjot enclave, construction of fly-over (Chandigarh – Ropar highway), etc.

Similarly waste or polluted water released from households activities, small factories, drainage etc. Sewerage treatment plant is set up near the dump yard. In which whole sewerage collected from the Kharar area through underground pipelines is treated in various aspects.

FIGURE 2.3.3: Wastewater flowing through open drainage, SAS NAGAR, Greater Mohali, Punjab, India

2.3.2 INTERVIEW OF THE RESIDENTS

People were interacted in and around Kharar area to understand their role in waste management, and the impact of waste on their health and environment.

2.3.3 FINDINGS THROUGH THE GOOGLE FORM

The questionnaire is formulated in such a way that it would help to know about the management facilities provided by the Municipal corporation, Kharar and the individuals opinion about the impact of waste generation on their health, neighborhood and on the environment. (https://docs.google.com/forms/d/e/1FAIpQLScrQ50e9ddclGjpbAln4gu9dvOZNOJj9a9Dkxd4ImQ-oQCh3w/viewform?usp=sf_link)

III. RESULTS AND DISCUSSION

Field survey, public interaction and responses have shown that 87.5% people segregate their household waste before handing over to garbage man; 90% of people facing health issues related with respiratory problems due to burning of solid waste. Due to uncontrollable waste disposal, 30-45% of the people are falling ill due to malaria and diarrhea. According to 92% of the residents, the open waste or garbage disposing sites consisting hazardous waste harms the stray animals too. 94% people believe that open dumping spoils the aesthetic value of the city and impact the sustainable development. 90% of the people believed that the solid waste is a major issue affecting the natural environment of Kharar area. Findings have shown that adequate facilities are not available to residents of Kharar area, as almost 72% of the people are not satisfied with the waste collection and disposing process. Though 98% people admits that waste disposal issues could be sorted out effectively only if each person identifies its role in waste management; yet waste disposal is a serious challenge for City Kharar.

3.1. IMPACT OF WASTE MANAGEMENT

3.1.1 CASE STUDY

CASE -1- The residents of Darpan city (Kharar) protested against waste management facilities of dumping area situated near their residence. People obstruct the entry of vehicles (garbage collecting vans) of MC for disposing the waste material at dumping site. According to the residents the site of dumping is causing various health issues to their families [18].

CASE -2- A resident of wrote a letter to MC of Kharar, according to him the waste management facilities not do their work accordingly. As MC of Kharar is awarded by the first prize for the waste management but the situation is totally different. The MC vehicle disposes almost 60 trucks per day in open dumping site without disposing accurately into the soil. This leads to breeding of mosquitoes and foul smell coming out from there. Which cause health issues to the residents living in that area [18].

CASE – 3 - The MC of Kharar was decided to install the STP of 10 millions of litres/day Currently, the sewage water was discharged into SYL canal that forms gap between the Kharar Bassi- Pathana road. Local people have objection with this. So the authority decided to install the project of STP, which conserve water as well as provide it to agricultural processes [19].

3.2 ROLE OF TECHNOLOGY IN WASTE MANAGEMENT

The MC of Kharar has established the waste management project at Darpan city to handle this challenging issue of waste disposal. Waste is segregated first and then accordingly sent to the

further processes depending upon the type of waste whether solid or liquid. Following are the techniques adopted by the waste management:

- **Treat land machine or segregating machines** - The waste material is segregated into biodegradable and non biodegradable material through the advanced technology by automatic treat land plant or segregated machines or waste sorting machine, which is setup at the dumping site.

FIGURE 3.2: Waste segregation or sorting machine

- **Bioremediation** – It is a process of degradation of hazardous or chemical waste material by the use of microorganism.
- **Incineration** – Incineration is a process of treating waste material through the burning of biodegradable material and converting it into ashes or incombustible material at higher temperature. This leads to the reduction of waste material up to 80-90% but ultimately leads to accumulation of suspended particles into the air causing air pollution.
- **Sewage Treatment Plant or Waste Water Treatment -** The main aim of the sewage treatment plant is to get rid off from pollution and removal of hazardous or toxic waste from the water and to use it again for the irrigational and agricultural practices. The treatment involves following process :
    1. **Preliminary step –** Involves screening of waste material then suspended to grit chambers from where waste goes to the process of skimming in different selectra zomes.
    2. **Primary treatment –**Involves settlement of sludge and sedimentation.
    3. **Secondary & Biological treatment –** Involves microorganisms (biological treatment) and chemical process of chlorination. (Activated Sludge System)

Figure 3.3: Preliminary Treatment

FIGURE 3.4: Primary and Secondary treatment

IV. CONCLUSION

It is concluded that waste management is a serious issue commonly faced by the people as management facilities does not provide promising results as of now. Unsafe waste disposal is worrisome for people living nearby that area. Major source of waste generation is household activities; hence involvement of local people plays a major role in management practices. The recycling and segregation of waste material in place of generation would have great initiative in

order to achieve the goals. Similarly the reuse of material comprises of steel or plastic plays a great role in reduction of waste generation. As technology plays major role in successful treatment and management of waste, Municipal Corporation of Kharar has been establishing new programs and treatment plants to overcome this problem and make the city pollution free. These programs also provide income for various houses which in turn effects per capita of the economy. Though situation seems challenging in handling waste disposal in Kharar City but implementation of strict guidelines by state and central pollution control board for waste disposal and role of individual could play an important role in significant reduction & management of waste.

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