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Problem of Solid Waste Management and its Impact on Urban Environment

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Abstract: ***The problem of urban solid waste management is regarded as one of the most important environmental issues, especially in developing countries. Municipalities all around the world are dealing with increasing levels of solid garbage and need to devise effective strategies to tackle the problem. It is critical to understand the amount of garbage created and the makeup of the waste stream in order to develop successful waste management in any location. Many research have established that the amount of waste generated is proportional to the population. There are several other factors which affect the amount and composition of waste. The enormous increase in solid waste generation particularly in large cities will have significant impact in terms of the land required for waste disposal***
Keyword: Environmental, Modern technological, solid waste, disposal of solid waste, unavailability of modern technological

I. INTRODUCTION BASIC CONCEPT OF SOLID WASTE MANAGEMENT

Solid waste management is widely regarded as one of the most critical environmental issues confronting developing-country cities. Many cities in developing countries are having major issues with solid waste management. The amount of waste produced each year rises in direct proportion to the population and level of urbanisation. Solid waste disposal issues have gotten increasingly difficult, necessitating the acquisition of more land for the final disposal of these wastes. The primary purpose of solid waste management in a city is to keep the city clean by disposing residual materials generated within the urban area and thus promoting for public health care and urban ecology.

Increasing environmental consciousness and interest in materials and energy conservation have lead to increasing sophistications in the management of solid waste over the past two decades.3 Solid waste management is a major problem being faced by municipal authorities. Collection of these wastes being the costiest elements of their management, of effective administration and efficient service mechanism.

It is one of the most essential services and it is an important duty of municipal bodies to arrange for daily street cleaning and transport processing and disposal of waste in urban areas. Improper disposal of solid waste cause serious environmental or ecological damage. Solid waste can harbor rodent and insects, which many act as vectors of infectious diseases such as typhoid, plague, dysentery etc. Solid waste disposal problems are the very large and ever increasing amounts of solid wastes generated by society and the difficulty in finding sites for new processing and disposal facilities.

II. LITERATURE REVIEW

Esakku et. al., (2007) have determined the quantity and quality of waste generated, waste generated rate and also exhibited the MSW services provided in Chennai city. It has been reported that MSW generation in Chennai , has increased from 600 to3500 tones per day within 20 years

Negi et. al., (2008) have reported the urban India generates about 1.0 lakh MT/day of MSW and it requires more than 1500 acres of land /year. The composition of MSW in typical Indian cities are reported as plastic/rubber (4%), Inert(15%), metals(3%), Glass and ceramics (5%), food & garden wastes(40%), paper(27%)and textiles(6%). It has been also reported that the MC of Delhi & New Delhi municipal council together provide municipal services to over 14 million citizens in Delhi.

Igbinomwanhia, D.I, (2012) research paper focused on commercial solid waste characterization and better management practices to improve the commercial solid waste generation in Benin metropolis in Nigeria. Result of the study showed that generation of about 44.96% of Garbage, 25.43% of plastic waste, 14.27% of paper waste, 3.21% of metal waste, 3.89% of glass, and 8.24% of other waste (ceramics, foam, clothes etc).

III. OBJECTIVE

The objective of this experimental study is to:

A. To examine the nature of existing solid waste problem of Bhopal City and its impact on urban environment.
B. To analyze the spatial pattern of municipal solid waste generation and collection method in Bhopal City.
C. To develop cumulative score index for assessment of urban environmental conditions of Bhopal City.

IV. RESEARCH METHODOLOGY

Ten variables have been chosen for the purpose of assessing the vulnerability of the city's solid waste problem: relative relief, population density, waste generation quantity, polythene generation quantity, literacy pattern, income, sweeper population ratio, sweeper road length ratio, sweeper bin ratio, and length of open drain (Nala's).
Each ward have been assigned score on the basis of selected criteria and the finally cumulative score of the individual criteria for each ward/zone has been calculated on the following formulas.

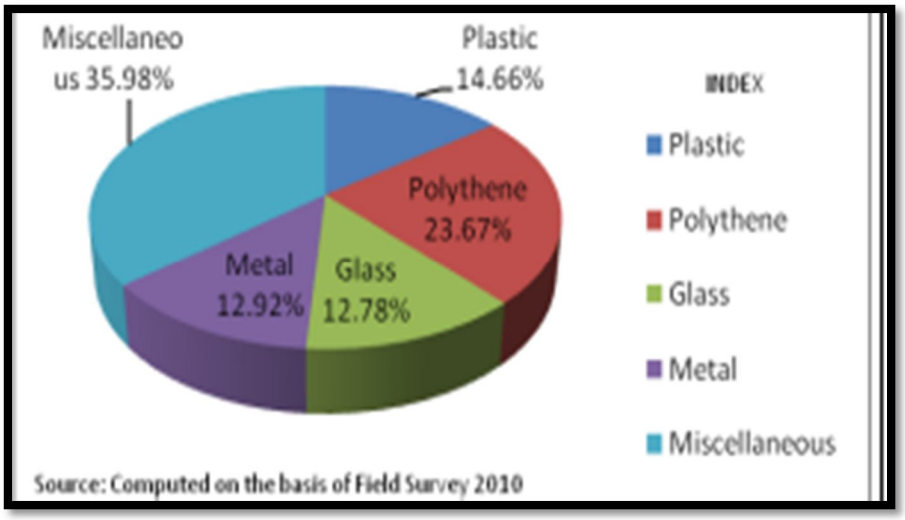
CSWN = Cumulative Score of Individual Criteria.
NW1,2,3,4,5 = No. of ward assigned score
S1,2,3,4,5 = Assigned score for each level
CSWn = NW1 x SW1 + NW2 x SW2+NW3 x SW3 + NW4 x SW4 + NW5 x SW5
The average cumulative score (Σ CSWn/NW1 Nw = No. of criteria) were categorized into very high, high, medium, low and very low.

A. Sampling Procedure
B. Interview schedule
C. Collection of data
D. Investigation
E. Physical Characterization of solid waste

V. ASSESSMENT OF SOLID WASTE GENERATION PROBLEMS

A. Identification and Characterization of Solid Waste Generation

In order to determine the type of solid waste created at the source and at the disposal site, an identification and characterization of solid waste has been taken into account. The composition of garbage at the source was examined, as well as the content of biodegradable and non-biodegradable waste in chosen sampled wards. The quantity of hazardous waste created and disposed in different spatial units was determined using the characterisation of municipal solid trash.



Composition of Non -Biodegradable waste,

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VI. ASSESSMENT OF SOLID WASTE COLLECTION AND DISPOSAL SYSTEM

A. Existing Method of Collection System in Bhopal City

Collection of waste presents severe problems as waste are thrown indiscriminately not collected properly and transportation is also far from satisfactory condition. The Central Pollution Control Board, New Delhi survey (CPCB, 2000) reported that 50 percent of waste is collected manually.1 In Bhopal City the responsibility of collection, transport handling, identification of disposal sites of solid waste lies with the Bhopal Nagar Nigam (KNN). But it has been observed that the collection efficiency is far from satisfactory condition due to improper and inadequate manpower, funds and infrastructure facilities.

Rubbish collection creates significant challenges, as waste is thrown indiscriminately and not adequately collected, and transportation is in poor shape. According to a survey conducted by the Central Pollution Control Board in New Delhi (CPCB, 2000), 50 percent of rubbish is collected manually. 1 The Bhopal Nagar Nigam is responsible for the collection, transportation, and identification of solid waste disposal sites in Bhopal City . However, due to insufficient and unsuitable staff, funding, and infrastructure, collection efficiency has been noted to be far from optimal.

Method of Street sweeping and waste transportation to nearly open dumps

Open dumping sites

VII. CONCLUSION

A. The management of solid waste is an important aspect of environmental protection and care. Solid waste management issues are widespread in any human settlement, but especially in major urban areas. Though the form and scope of the problem differs depending on a variety of conditions, municipal solid trash is an inescapable byproduct of human civilization that must be managed effectively, scientifically, and efficiently. Various activities generate a large amount of solid trash in every urban centre.

B. The annual waste generation increases in proportion to the increase in population and urbanisation, and with the rapid development and changing life styles in cities, waste composition has also changed from primarily organic to primarily plastic, paper, and packaging material, all of which are complex in nature of storage and collection systems.

C. It has been discovered that waste properties vary greatly from ward to ward, as well as seasonally and over time. A large amount of solid trash is simply dumped in a depression or pond for a length of time without any prior awareness of its features.

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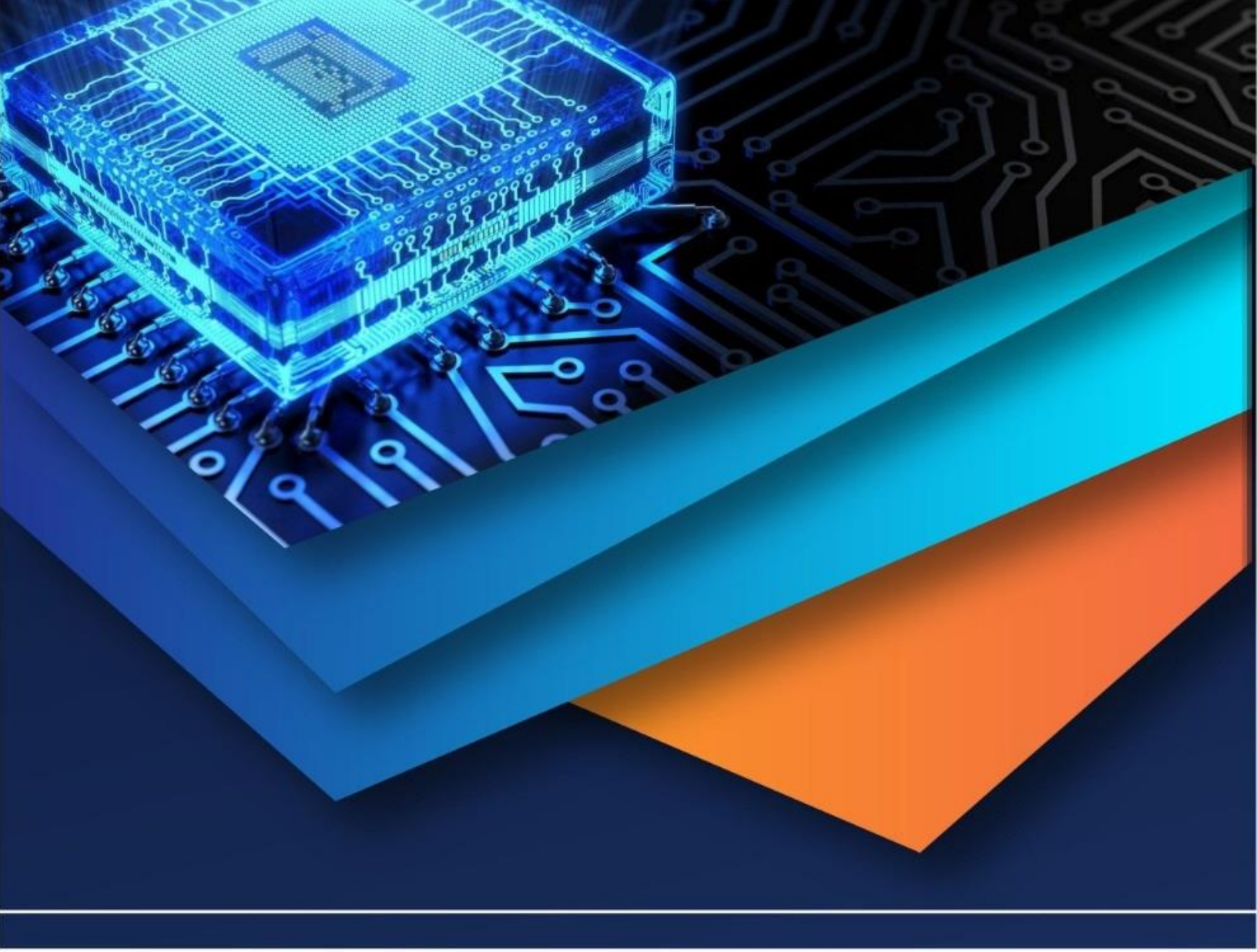

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