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**AN ANALYSIS ON VARIOUS PLANNING FOR
IMPLEMENTATION OF SOLID WASTE
MANAGEMENT SYSTEMS: STRATEGIC ISSUES
AND CHALLENGES**

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An Analysis on Various Planning For Implementation of Solid Waste Management Systems: Strategic Issues and Challenges

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Abstract – Waste management is a global environmental issue which concerns about a very significant problem in today's world. There is a considerable amount of disposal of waste without proper segregation which has led to both economic and environment sufferings. It is still practiced in many cities. There is a tremendous amount of loss in terms of environmental degradation, health hazards and economic descend due to direct disposal of waste. It is better to segregate the waste at the initial stages where it is generated, rather than going for a later option which is inconvenient and expensive. There has to be appropriate planning for proper waste management by means of analysis of the waste situation of the area.

The waste management issues are considered to solve some of the present situation problems like proper allocation and relocation of waste bins, check for unsuitability and proximity convenience due to waste bin to the users, proposal of recyclable waste bins for the required areas.



INTRODUCTION

Solid waste is the unwanted or useless solid materials generated from combined residential, industrial and commercial activities in a given area. It may be categorized according to its origin (domestic, industrial, commercial, construction or institutional); according to its contents (organic material, glass, metal, plastic paper etc); or according to hazard potential (toxic, non-toxin, flammable, radioactive, infectious etc).

Management of solid waste reduces or eliminates adverse impacts on the environment and human health and supports economic development and improved quality of life. A number of processes are involved in effectively managing waste for a municipality. These include monitoring, collection, transport, processing, recycling and disposal. Improving solid waste management services in India is an urgent challenge for all levels of the government. Littering and the indiscriminate disposal of solid waste are widely practiced, polluting India's air, water, soil and inhabitants. Such pollution impedes India's efforts to achieve the Millennium Development Goals (MDG). The nation's measures to combat malaria and other diseases (MDG 6), reduce child mortality (MDG 4), and ensure environmental sustainability (MDG 7) are all hampered by the unsightly and unhygienic conditions created by the accumulation of waste.

Accumulated solid waste clogs drains, causing water stagnation and flooding. Pools of mixed solid and liquid waste, often combined with human feces, create breeding grounds for pests such as rats, mosquitoes, dogs, flies, fleas, and cats. These pests serve as vectors that spread diseases such as malaria, polio, chikungunya, dengue, cholera, typhoid, and schistosomiasis. India's high infant mortality rate is due largely to poor sanitation.

According to the Ministry of Rural Development, approximately 88% of the total disease load is due to lack of 1 clean water and sanitation, and the improper management of solid and liquid waste. Burning mixed waste creates toxic byproducts and noxious fumes. Improving solid waste management services involves integrating activities that include the segregation, collection, storage, transportation, processing and disposal of solid waste. This document presents the common steps that five localities took to establish and operate innovative solid waste management systems.

Solid-waste management is a major challenge in urban areas throughout the world. Without an effective and efficient solid-waste management program, the waste generated from various human activities, both industrial and domestic, can result in health hazards and have a negative impact on the environment. Understanding the waste generated, the availability of resources, and the environmental

conditions of a particular society are important to developing an appropriate waste-management system.

Solid-waste management may be defined as the discipline associated with controlling the generation, storage, collection, transfer and transport, processing, and disposal of solid waste

in a manner that is in accordance with the best principles of health, economics, engineering, conservation, aesthetics, and other environmental considerations, and that is also responsive to public attitudes. In its scope, solid-waste management includes all administrative, financial, legal, planning, and engineering functions involved in the solutions to all problems of solid waste. The solutions may involve complex interdisciplinary fields such as political science, city and regional planning, geography, economics, public health, sociology, demography, communications, and conservation, as well engineering and materials science.

For instance, if waste is wet or has a low heating value, it would not be possible to incinerate it without adding supplemental fuel. If a portion of the waste stream consists of organics and can be easily separated from other waste materials, bioconversion of the waste may become a viable strategy. On the other hand, the waste generated by industrialized countries may be different from those generated by nonindustrialized countries. Nonindustrialized societies may have more organic waste than those generated by industrialized countries. If this is the case, composting or anaerobic digestion may be more suitable for organic waste management.

The activities associated with managing solid waste from the generation point to final disposal normally include generation, reduction, reuse, recycling, handling, collection, transfer and transport, transformation (e.g., recovery and treatment), and disposal. Depending on sitespecific conditions, a sound waste-management program can be established by combining some

of the necessary activities into integrated solid-waste management. On the other hand, legislative efforts and effective implementation are vital for the safe management and disposal of solid waste. Incentives may be provided for the development and practice of safe treatments, harmless manufacturing processes, and methods for converting solid waste into valuable resources by recycling and reuse. On the part of industry, industrial waste-management is also indispensable from the viewpoint of both the social responsibility of business corporations and ISO 14000, which will influence their survival in global markets.

The new millennium has introduced the global focus on sustainable development, especially in the area of solid waste. Solid-waste management is the responsibility of the municipalities under the provision

of their respective acts. Solid-waste management practices in developing countries like India are far from satisfactory, and the associated problems are due to a lack of technical expertise, financial constraints, and legal provisions. Generally, state and municipal governments consider solid waste a low priority, and consequently give less budgetary support to this field. Slow decision-making processes in the municipalities create an additional hindrance. In a broader sense, municipal solid-waste management is a very complex task, as the social, economic, and cultural cooperation among households, communities, enterprises, and municipal authorities is minimal and a lack of awareness of the rules and regulations, as well as environmental concerns with poor resources, have created a chaotic situation. Although India has formulated legislation relating to municipal solid waste, hazardous waste, and biomedical waste, the compliance and awareness of rules among communities and municipalities are lagging behind. Waste collectors and rag pickers take out the recyclable portion of solid waste and sell it to retailers, which is recycled in the informal sector to the extent of 10% of the waste generated, but no efforts have been made by the government to encourage a recycling industry.

The municipal corporations and municipalities generally collect solid waste through various modes of transportation like handcarts, animal-driven carts, rickshaws, etc. and street sweeping is carried out manually. Generally, municipal solid waste is dumped in low-lying areas by the smaller town municipalities without caring about the environment, whereas a regulatory framework is being partially followed by metro-cities. Cities with a million-plus population are complying with some of the regulations and Green Productivity practices in various activities of solid-waste management, namely the segregation of solid waste, composting at the community level, the transportation of solid waste in closed vehicles, and its disposal in controlled landfill sites having weighbridge facilities with a leachate-management facility.

Solid-waste management, especially in India, can be practiced efficiently and in an ecofriendly manner through Green Productivity measures, and by considering and incorporating various policy, legislative, financial, technology, and management issues.

SOLID WASTE MANAGEMENT PLAN

An ideal solid waste management system works on four basic principles viz. segregation & primary storage at the source, collection, transportation, treatment & disposal.

Segregation at source -

- Segregation of waste is one of the critical activities in the Solid Waste Management as

it saves undue efforts on transportation and disposal of recyclable or inert wastes. The segregation of such wastes, before they are transported to the processing /disposal site, should be carried out.

- The SWMC would educate its sanitary workers about the revenue earning potential of recyclable waste and various options to earn revenue. The sanitary workers should be advised to collect such waste separately. To encourage collection of recyclables, SWMC may think of devising a plan which can provide some revenue opportunities for the sanitary workers. Market potential with respect to the forward linkages for effective disposal of recyclable waste is to be identified and exploited by the SWMC for the purpose.
- Collection & segregation of hazardous wastes from the workshops viz. used batteries, transformer oil, used oil, metal scraps etc. and selling them to CPCB registered vendors having Environmentally Sound Management (ESM) system.
- The operator of waste processing/disposal facility should be advised to carry out inspection of waste received to further segregate recyclables and sell them to recyclers. If it is not feasible to segregate recyclables on their own, the processing/disposal facility operator may allow registered scavengers to enter the premises of the compost plant and pick recyclable waste. This would ensure reduction in rejects, reducing burden on processing plant as well as landfill.
- SWMC may register the names of recyclers for the recyclables such as plastics, newspapers, glass, metals etc. from residential and commercial sources and the names of registered recyclers should be published or made known to the public residing in the project / labour colonies / labour sheds.

Primary Storage of Wastes - It is recommended to segregate waste into two categories & store the segregated wastes in two different containers:

- One container (Green Coloured) for the "Biodegradable Waste" or the "Wet Waste" and
- Other container (Blue Coloured) for the "Non-biodegradable Wastes" or the "Dry Waste".
- The wet & dry wastes are to be stored in two different containers as mentioned above. As

the biodegradable waste degrades and generates liquid, it is advisable to use non-corrosive container with lid for the storage of bio-degradable/wet waste.

- A Green coloured container of 10 liters capacity for a family of about 5-6 members would generally be sufficient for wet waste. However, it is advisable that a household should keep larger container or standby container to store the additional wastes produced in 24 hours. The household may have a spare capacity of 100% to meet unforeseen delay in clearance or unforeseen extra loads.
- Dry waste can be stored in another Blue coloured container of 10-12 litre capacity or plastic bag/Jute Bag/plastic/polymer containers.
- The containers are to be procured by SWMC and provided to individual households in the project colonies & labour colonies/camps. Some containers of bigger capacity (0.5 m³) will also be kept at public places, as community bins, like offices, workshops, shops, community centre, school, canteens/mess, guest houses etc. The places where community bins have to be placed away from drinking water sources and preferably on elevated areas where water stagnation is not there during rainy days.

Collection of Solid Wastes -

- It is recommended to have a mechanism for door to door collection of waste from the staff/ labour colonies and labour sheds. The sanitary workers / sweepers) will have tricycle with containers or containerized handcarts having ringing bell and will go for waste collection from individual house at a fixed time every day. The sanitary workers would ring the bells at the time of reaching the particular area/locality, giving a signal for waste collection to the residents.
- In labour colonies also, the door-to-door collection of waste would be carried out. The containerized rickshaws or handcarts would be employed for collection of wastes. The labourers should be strictly advised to store the wastes in available plastic containers of suitable size. The waste bins including community bins are to be cleaned daily by the sanitary workers at an informed timing.
- During collection of wastes from the bins, care shall be taken to avoid waste spillage

and it shall be the responsibility of the sanitary workers to clean & maintain hygienic conditions at the places where community bins are kept.

Transportation of Solid Wastes -

- It is recommended to use tricycles/push carts/containerized handcarts, for primary collection of waste from the individual households, offices and other public places, as described above, up to the waste storage depots. The sufficient number of tri-cycles / push carts/containerized handcarts shall be arranged for effective door-to-door collection system.
- The wastes collected from the street sweeping & drain cleaning is to be shifted to the waste storage depots using tricycles/handcarts.
- The transportation of waste from the waste storage depots to the processing and disposal sites will be done in the covered trucks/dumpers etc. so that the waste is not exposed to the human population and there is no spillage of waste on the roads during transportation.
- To take care of certain unavoidable circumstances, if it is required to lift waste from some open place, front-end loaders and tractor trolleys may be used. However, the waste in tractor trolley has to be covered with LDPE sheet during its transport.

Solid Waste Management: Advancement Strategies

Solid waste management arrangements offer an assemblage of profits for tribes and Alaskan Native villages. Through the arrangement of these arrangements, you can evaluate your dog rent and future waste management needs, set necessities, and apportion assets likewise. Working through these issues can help you guarantee your waste management system offers the largest amount of assurance to the strength of tribal parts and the earth. This part demonstrates the reason for solid waste management arrangements and the steps included in improving these arrangements. It additionally incorporates references to solid waste management arrangements that tribes have recently advanced and are effectively actualizing. All through this part, some productions are referred to or referenced.

A solid waste management arrange is basically an archive improved by a tribe or Alaskan Native village that blueprints how the tribe or Native village will diminish, administer, and discard its solid waste. A solid waste supervisement arrange will aid and guide your tribe or village in improving and actualizing its solid waste management program by creating what

movements need to be taken and setting the criteria for choice making.

Solid waste management has remained moderately stable in the County since the selection of the CSWMP in 2001. The foundations to solid waste management in the County are:

- The 20-year contract between Grays Harbor County and Harold Lemay Enterprises, Inc., to work the Central Transfer Station and reusing projects.
- The 20-year contract with Regional Disposal Company to fare solid waste to the Roosevelt Regional Landfill in Klickitat County.
- Providing solid waste training administrations.

This arrange is a report for regulating the activities of government, haulers, occupants, and organizations in the County.

SOLID WASTE MANAGEMENT PLANNING REASONS

Planning is the first stage in planning or enhancing a solid waste management system. A solid waste management plan will help your tribe take institutional, social, budgetary, investment, specialized, and ecological elements into attention as it administers its waste stream.

A solid waste management plan is a commonsense report that can help guide your neighborhood's solid waste management endeavors. It can help you:

- Define and comprehend current waste management practices and the system set up.
- Identify issues and insufficiencies with the present system.
- Identify chances for development in the present system.
- Set necessities for activity to address issues and influence change.
- Measure advance to actualizing movements.
- Identify the assets required and advance plans and plans.
- Revisit and change necessities as the plan improves.

A solid waste management plan additionally can sup-port recommendations for solid waste management concedes. Government organizations

that furnish monetary support to tribal neighborhoods for solid waste management put a high necessity on exceptional planning to back a gift proposal. Orgs included in financing tribal solid waste management ventures frequently favor that a tribe complete a solid waste management plan as an essential for award provisions identified with solid waste taking care of offices or shutting open dumps. Moreover, tribes can make a request for financing for a venture that is a stage to unraveling, however does not totally settle, a solid waste issue. Case in point, an office could be less averse to store clean up and conclusion of an open dump site if the tribe offers a plan tending to the waste presently being created, for example taking waste off site to an affirmed office.

Your starting plan can portray existing waste management practices, recognize existing system impediments and chances for development, and outline a plan of movement to address these confinements and make changes. In the event that it is well thoroughly considered and adequately depicts your tribe's necessities, objectives, and plans, this introductory plan will be sufficient to uphold your solicitations for subsidizing prospective exercises.

PROBLEMS DUE TO POOR SWM

Now the situation was such that there were several drawbacks of this garbage accumulation and even worse were its consequences, some of them are,

- The biggest threat to a locality is, the waste could be a breeding ground for flies, insects, bacteria, fungus and many such micro-organisms. This could spread diseases and it would become worse during rainy season and the contamination might end up in some epidemic like cholera, malaria etc.
- Bad odour is created around the garbage area, making an unbearable environment.
- Poor waste pickers pose a serious threat to public health.
- Animals like cats, dogs, goats and cows come to the garbage in search of food and end up in spreading the garbage around the bins.
- The economic factor is also affected, the market value of a particular area decreases if there is a badly maintained waste area nearby as it poses a bad aesthetics.
- It overall leaves a bad impression and poses a threat to the environment

CONCLUSION

This study has succeeded in getting information on family units' solid waste era and accumulation plan, waste disposal techniques and ID of solid waste dumpsites in the region. The study has demonstrated the effectiveness of GIS innovation in waste management in a mind boggling urban setting, uplifted by the powers of urbanization, expand in populace, and expanding socio-investment exercises.

The model proposed in this paper was designed for planning the allocation of waste bins in the case study area. There were several aspects taken into consideration in planning the waste management by evaluating the bin allocation. First was to analyse the location of the existing waste bins in the area. The planning concern was to verify the convenience and inconvenience of the users from the existing bin location. This was done by checking the location of bins for a convenient proximity distance for all the users and also for the inconvenience to the users due to close proximity of the bins to sensitive land uses. The planning of waste bin allocation also included the segregation of waste in two categories and for this, the provision of recyclable bins was proposed.

The main aim is to provide good SWM facilities to the citizens which could maintain a healthy and clean environment in a economic way. There can be lot of advancements in the system but it have to be carried in stages according to the availability of resources.

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