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Present Status of Solid Waste Management System in Asansol Municipal Corporation

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Abstract: *Asansol is one of the most important urban agglomeration of West Bengal. The present study is nothing but a useful effort to examine the present status of solid waste management system of AMC area and also highlight the different sources of solid waste. At present solid waste management is a vital issue as its plays a significant role in development of urban environment. The AMC has made various effort to keep the city clean and bring about public discipline but which is not sufficient for present situation. For that in this paper I try to give some recommendation and suggestion for the improvement of solid waste management system prevailing in the city for making the city environment healthy and clean.*

Keywords: *Asansol Municipal Corporation, Composition, Generation, Recommendation, Solidwaste.*

I. Introduction

Solid waste is the term used to describe non-liquid waste material arising from domestic, trade, commercial, agricultural and industrial activities and from public services. Waste is a combination of various heterogeneous discarded materials. It is commonly known as garbage, refuse, rubbish or trash.

It is a common knowledge that waste is nothing but a useful material at wrong place. Every materials in this world may be useful if we try to proper utilization of these materials. We considers certain things as waste because of our ignorance as there are several cycles of nature which sustain the world. So it is very important to change the attitude of people about the solid waste.

The fundamental objective of solid waste management program is to reduce the environmental pollution and as well as utilizing the waste as resource. For fulfillment of the objective is requiredwell financial support and good awareness of people.

The methods of solid waste management vary greatly with types of wastes and locality. So the best systems must be designed by considering the local conditions and factors such as available technology, financial support , awareness of people ,prevailing system, traditional wisdom etc.

Solid waste management is one of the important obligatory functions of not only urban local bodies but also of rural local bodies . But these essential service is not properly performed by the local bodies of West Bengal, resulting in many health and sanitation problems. It is observed that lack of financial support, institutional weakness, wrong selection of technology, transportation systems and disposal options, public's apathy towards environmental cleanliness and sanitation have made this service unsatisfactory.

II. Study Area

The Asansol is the second largest urban agglomeration of WB at Burdwan District. It is located within the Raniganj-Asansol coal mine belt surrounded by the river Ajay on northern side and river Damodar on the southern side. Geographically it is located at 23.03 degrees 40 minutes 25 seconds North and 86 degrees 56 minutes 45 seconds East. The total area of AMC is 127.24 sq.km with a generally flat and north to south sloping topography . It has an average elevation of 110-130 metresfrom mean sea level.

III. Objectives Of The Study

The present study is concerned with the following objectives-

1. To find out the present patterns through which SWM practice is done in AMC area.
2. To identify the different types and sources of solid waste.
3. To find out the amount of solid waste generation , their collection pattern and disposal system.
4. To highlight the problems associated with prevailing solid waste management system.
5. To give some recommendation and suggestion for the improvement of SWM system.

IV. Types Of Solid Waste Found In AMC

A) **Ashes and residues**: Materials remaining from the burning of wood ,coal, coke and other inflammable wastes in institutions, homes, stores, industrials and municipal facilities for the purpose of heating and cooking and above all the remains of combustible wastes are categorized as ashes and residues. These materials are generally composed of fine powdery materials, cinders, and small amounts of burned and partially burned materials.

B) **Rubbish**: This comprises of various kind of flammable and inflammable materials of households, institutions of commercial activities etc. The combustible rubbish includes the materials such as paper, cardboard, furniture parts, textiles, rubber, leather wood etc. Non-combustible rubbish consists of glass, broken crockery, plastic, discarded tins, aluminum cans and materials made of ferrous and non-ferrous materials.

C) **Demolition and construction waste**: Waste from demolished buildings and other structures are classified as demolition waste. Waste from the construction , remodeling and repairing of individual residences, housing complexes, multi storied flats, commercial buildings etc are classified as construction wastes which includes stones, concrete , bricks, plaster and plumbing.

D) **Industrial process wastes**: It consists of the solid and semi-solid wastes coming from industrial plants. The specific characteristics of these wastes vary depending on the nature of the manufacturing process.

E) **Municipal wastes**: Wastes such as street sweeping materials, roadside litter, litter from municipal dustbins, dead animals and abandoned vehicles. Municipal waste includes rubbish, trash and almost all types of waste.

F) **Food waste**: Food wastes are the residues of various kind of foods like fruit, vegetable,animal product resulting from handling, preparation and eating of foods.

G) **Other waste**: Besides the above mention types of wastes there are found many kind of biodegradable and non-biodegradable wastes coming from different sources like hospital, market, pathological lab etc.The biodegradable waste consists of all carbonaceous wastes and non-biodegradable waste includes inorganic wastes and non-degradable polymeric organics like certain types of plastics.

V. Main Sources Of Solid Waste

a) **Waste from residential areas**: The waste generated from residential areas are generally named as domestic waste. These kind of waste varies a lot based on the socio-economic conditions and cultural situations. In developed residential areas where gas or electricity is used for cooking, the waste generated will be less compared to the low-income residential areas where wood or charcoal is used as fuel. Paper, cardboard, tin and bottles are found to be more in prosperous settlements and in commercial areas.

b) **Waste from shops/vegetable/ fruit market**: The wastes generated from the shops, vegetable and fruit market consists ofpolythene, paper, dried plantain leaves etc. Most of the wastes coming from shops and vegetable or fruit market are degradable in nature which is used for wrapping agricultural goods.

c) **Waste from hospital/ nursing home/medical stores**: Hospital , nursing homes and medical stores have a great contribution on solid waste generation at AMC. Different kind of solid wastes like unused medicine, saline bottles, medicine cover are generated some of which are non-degradable.

d) **Waste from Hotels/Restaurants/Eating stalls**: Hotels and Restaurants generate both degradable and non-degradable waste. The domestic type waste generated will be large in quantity and hence to be removed daily. They can be provided with separate bins for waste collection.

e) **Waste generated by street hawkers**: Street food vendors and hawkers generate large quantities of waste particularly food waste and plastic paper plates.

f) **Waste from Slaughter Houses/ Fish markets**: Slaughterhouses and fish markets generate highly putrescible matter. They decay very fast and are the main reason for the malodour near these premises. No paper collection or removal is practiced and hence the waste rots in the premises itself.

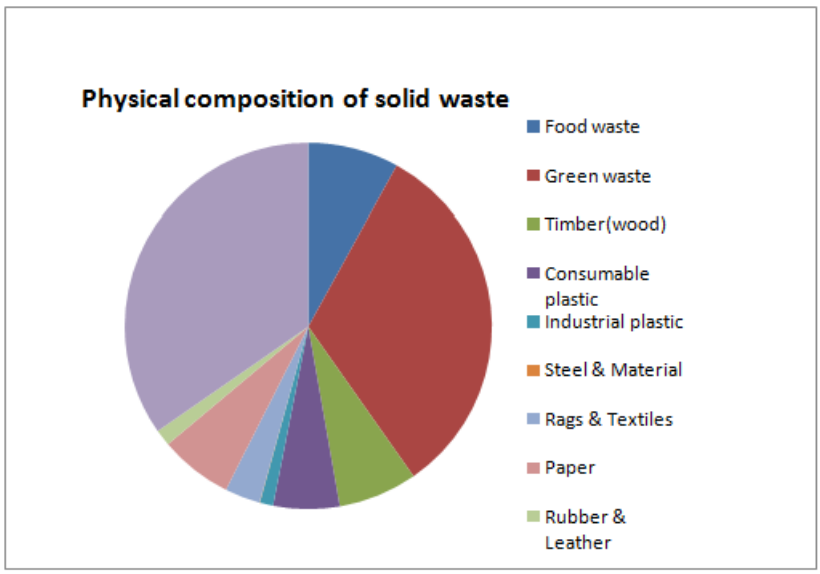
VI. Composition Of Solid Waste

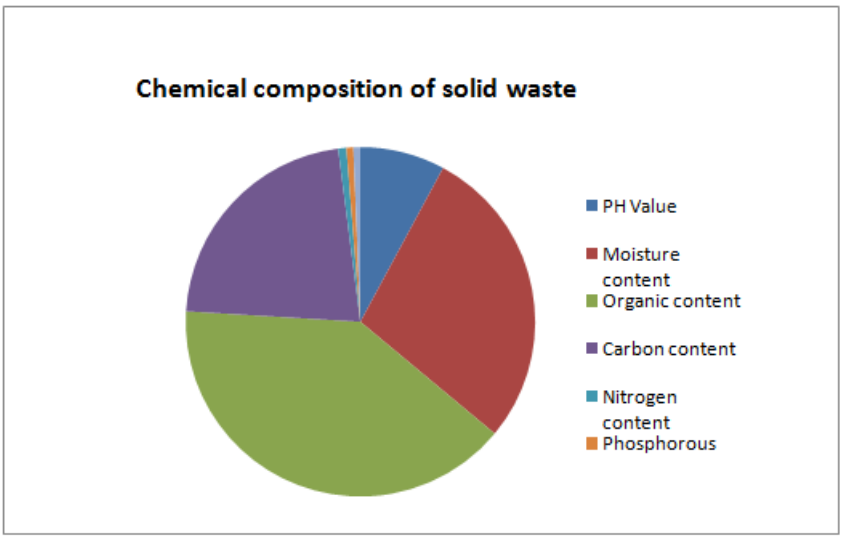
Information about the physical and chemical composition of solid wastes of AMC is essential for evaluation, processing and recovery . Besides it helps in adopting and utilizing proper equipment and techniques for collection and transportation. The main physical and chemical composition of solid waste are given below by charts-

Chemical composition of solid waste	
Components	% of components
PH Value	7.68
Moisture content	27.6
Organic content	39.06
Carbon content	21.53
Nitrogen content	0.73
Phosphorous	0.63
Potassium	0.63

Physical composition of solid waste	
Components	% of Components
Food waste	8
Green waste	32.25
Timber(wood)	6.99
Consumable plastic	5.86
Industrial plastic	1.18
Steel & Material	0.03
Rags & Textiles	3.14
Paper	6.45
Rubber & Leather	1.45
Inert	34.65

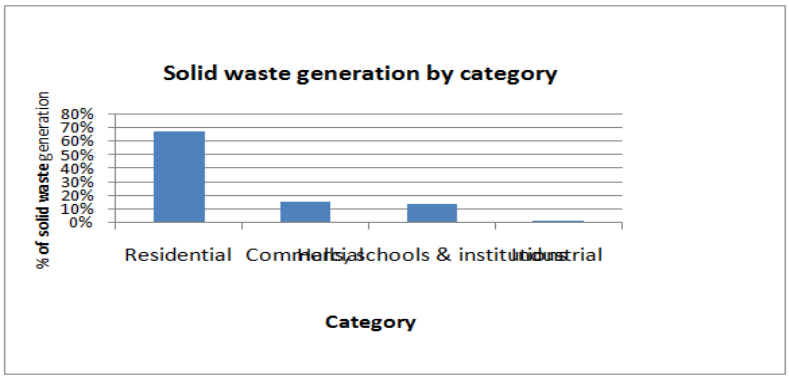
Source: Asansol Municipal Corporation-2015





VII. Solid Waste Generation

At present in AMC area per capita solid waste generation per day is 320gms and the estimated generation of solid waste per day is 220 MTs , among which garbage is 175 MTs and building debris is 45 MTs. If we consider the categorical distribution of solid waste generation, then we find the following characteristics. The residential areas contribute 68%, commercial sector 16%, halls, schools, institutions contribute 14% and generation from industrial sector is 2%. Besides the above mention category hospital and clinic have separate contribution to solid waste generation.



VIII. Solid Waste Management System Of Amc

Asansol is one of the first growing corporation of West Bengal. AT present AMC has50 wards and 563917 population. During the last few years the activities and attitude of people have been change rapidly. Consequently the type and characteristics of solid waste also changed. The AMC is responsible for collection, transportation, management and disposal the garbage generated within the city limits and it is a major headache of AMC as the quantity and variety of solid waste increased day by day. Though the AMC has a well-established and planned centralized solid waste management system but it is quite unsatisfactory and subject considerable part of population to serious health risk. At present many good actions have been initiated by the AMC though which is not enough for managing the present solid waste scientifically.

Primary collection of solid waste: The primary collection of solid waste is done by fully with man power. For primary collection there are several no of workers with specific work scheduled. The workers perform their duty in three shift which includes morning shift from 6.00 A.M to 11.00 A.M, day shift from 11.00A.M to 2.00 P.M and evening shift from 2.00 P.M to 5.00 P.M. In addition there exist a night conservancy service between 8.30 P.M to 1.00 A.M. The primary collection includes the following activities-

1. Sweeping in different areas for collecting the garbage .
2. Storing the garbage in the specific bins.
3. Door to door collection the garbage.
4. Collecting the waste from the house holds by Tricycles for unloading in transfer stations.

The workers perform the above mention activities by using the following implements- brooms, baskets(bamboo and aluminum), brushes, iron plate, containerized push carts, tricycles and roto- mould wheeled bins. All the implements are supplied from Asansol Municipal Corporation. One of the most important achievement of AMC is the introduction of Tricycle which stands as a wonder tool for better collection of MSW at door steps.

Secondary Collection: Secondary collection is the transfer of solid waste from street to transfer stations and from transfer stations to disposal sites. For these activities there are engaged several numbers of heavy vehicles like dumper and lorries and light vehicles like tractor , van , chottahathietc with specific route scheduled for each and every vehicle for each trip. There are 12 solid waste transfer stations in AMC. No. of trips allotted for heavy vehicle is 3 trips per day and 4 trips for light vehicle per day. Which is responsible for transferring 210 tons garbage to transfer station per day.

Waste Disposal: At present there are two waste disposal site under the AMC which are open dumping and partly covering with debris. One dumping ground is located at Kalipahari covering an area around 27 acres and another is located at Samdihi, Burnpur covering an area around 03 acres. Daily average disposed of solid waste to these sites is 200-210 MT/Day. For improving the existing Landfill sites as SCIENTIFIC Engineered Landfill M/s. GEPIL has constructed a Sanitary Engineered Landfill site.

IX. Problems Associated With The Present Solid Waste Management System In Amc

The existing arrangements for solid waste management in AMC are highly unsatisfactory . In spite of the availability of a number of proven technologies, the authority of AMC is not in a position to implement any, because of various sociopolitical and techno-economic issues. The major finding problems are –

1. System of primary collection of solid waste is not properly maintain because of irregular sweeping and collection . Besides workers engaged for this collection are not trained and they do not perform their duty properly.

2. Lack of sufficient dust bins is one of the major problems. There are many areas where dustbins are not found that's why people of these areas force to throw the waste materials on road and fallow land which is not collected by municipal workers.
3. Wrong placement of dustbins are found influencing by political leader which creates disparity among the people. Consequently people of many areas are not avail the facility which generates huge amount of street waste.
4. Many people of AMC have a tendency to throw the waste materials on street or nearest drain instead of storing these materials at available dustbins. It is happens due to proper education and ignorance of people about the crucial effect of solid waste.
5. The present transportation facilities available in AMC for solid waste disposal is not adequate for transporting all garbage collecting from different sources.The no of trips per day allotted for the waste disposal will not carry the present materials.
6. The number of workers engaged for the collection is not sufficient. It is very essential to increase the number of workers according to ward and producing solid waste. Besides number of vehicles also not sufficient for transporting the solid waste.
7. The implements used in primary collection are old except the tricycles and most of the workers are untrained.
8. Lack of disposal site due to increasing population and rapid urbanization . In AMC areas two disposal sites are used for solid waste dumping but these are not spacious and far from the main city causing additional time and cost for transportation.
9. One of the important problem is to observe the duties of municipal workers engaged in solid waste management system. There is no centralized pattern for observing the duties of workers .Existing observing pattern is not fulfill the public demand .
10. Finally the system of municipal solid waste management of Asansol Municipal Corporation is not up to date . All aspects related to solid waste management such as techniques, equipment, vehicles, manpower are outdated in the context of present highly technologically advanced society.

X. Suggestions And Recommendations

The following suggestion and recommendation may bring the fruitful results of present status of solid waste management system in Asansol Municipal Corporation. These are-

1. To take the strategies of integrated solid waste management which includes the following tasks-

a) To reduce the amount of solid waste generated.
b) To recycle as much refuse as possible.
c) To incinerate or to change to compost the waste with appropriate environmental controls and with energy recovery actions.
d) To continue sanitary land filling for selected waste items.

2. Awareness campaigns and official notifications can bring about considerable changes in the attitude and perception of the people towards solid waste management.
3. Introduction of training programme for the all workers engaged in solid waste management system may be helpful . In addition promotional opportunities may be initiated for the best workers by the AMC which helps to grow the interest among the workers.
4. Community involvement is an essential criteria for the success of any programme . The community must be made aware about the programs, the processes, advantages and disadvantages. All the people must participate in the solid waste management programs with a common interest of environmental development.
5. Besides the centralized system of AMC, decentralized segregation and collection systems can be introduced in the city with the participation of the residents association.
6. For the success of the waste management activities it is essential to introduce an integrated and well-planned programme with the active participation of all the stakeholders.
7. Use of social media like newspaper, TV, Radio can bring the well results in the solid waste management system as present generation is totally media dependent .
8. Pre-disposal activities such as pyrolysis, incineration,composting, conversion to protein, hydro-pulping, plasma gasification etc should be introduced in AMC for better management.
9. Social Engineering through proper networking of the various stakeholders is an important factor for the success of any sanitation activity. The residents associations and voluntary organization can play a major role in this context.
10. Finally proper institutional structure and financial support are very significant for providing technological as well as social engineering support to the solid waste management programme.

XI. Conclusion

Waste is an inherent result of economic activity , as it is of any metabolic system. The ultimate goal of waste management is the absence of waste ,i.e. to get rid of it, to use it as resource , or not to have it in the first place. Preventing the production of waste materials is not usually considered a part of waste management in its strict sense. The term ' Integrated Waste Management' (IWM) has been coined to include front-end measures such as design , exclusion of problematic materials in products, etc. as integral parts of waste management. Waste can only be prevented at the front end of the material cycles by changing the way goods are produced and consumed.The lifestyle of the people of AMC has undergone an enormous change. The large open areas surrounding the houses are lost day by day. Consequently types and pattern of economic activities has been changed. Waste is an inherent product of economic activity. The surge in productivity and connected consumption in the second half of the past century has led to a massive increase in material flows in the anthroposphere, creating environmental problems. So from the above discussions it may be concluded that AMC is very far from the solid waste management in true sense. Under this circumstances it is very important for the authority of AMC to follow the following scientific, technical, political and economic guidelines for implementing a true sense solid waste management system. The guidelines includes the following points-

1. Waste disposal systems should generate materials which can be recycled or deposited in a final disposal site.
2. Hazardous substances must be concentrated , not diluted.
3. Organic substances are not compatible with final disposal sites.
4. Waste management is guided by the environmental protection laws.
5. Waste disposal systems must be environmentally compatible.
6. Regional responsibility for planning of landfill sites is applicable.
7. Public authorities play subsidiary role in waste management.
8. Waste should be recycled if the result is less environmental pollution than disposal and production from virgin materials .Recycling must be profitable.
9. Public authorities should not subsidize waste disposal systems.

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