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SOLID WASTE PROBLEM AND MANAGEMENT IN KALIAGANJ MUNICIPALITY

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ABSTRACT

'Asking how much is enough'*(Brown et al., 1991) raised a storm among Sustainable society during 1990s. The question was how much the human population needs to consume. Over-consumption of natural and man-made products created this title. The aspiration and desire of people became high. The 4.2 billion people of Developing Counties want the same lifestyle as individuals in More Developed Counties do. Thus the consumption via-a-vis Solid Waste generation have been increased hurriedly. Our life is a 'Rat-race' were we wish to adopt severe speed in our every development and thus to fulfil this objective we support industrialization, urbiculture and the way of Creole. We are trying to dress the Earth with plastic. But we overlook that with each step towards development bears some mal-development issues. World as well as the population of our country is increasing very hastily.*

KEYWORDS: *industrialization, urbiculture , environment pollution.*

INTRODUCTION

The problem is not concerned within this fast growth but the unexpected increased or rather ever increasing demand of people. On other side, science and technology is the twin-brother and they are always extending their hands for recurring to this demand and the result is very perilous. The heap of Solid Waste has become a serious issue in regards to the contribution towards environment pollution. We are civilized but our Solid Waste pollution is the uncivilized occurrence for our environment. We are modern, advance and tech-lover. But our perception couldn't be modernized yet to become a little thoughtful towards nature. We use the outcome of science without the nature being much of our concern. Our perception has shifted from an overall progress to single target of fulfilling our desire. And to fulfil every desire different Solid Waste are being generated at our every step. Our population is still growing and we are producing more garbage (Young, 2010). Solid Waste, as a harmful discharge of human's materialistic world is also detrimental for global, regional or local level development in respect of environmental deprivation and a noteworthy source ofpollution that includes large number of used materials ranging from small pins, glassware's, toys, plastic contains, rejected shoes, poly-bags, waste papers, discarded garments, tires-tubes, disposal parts of industrial products, and most recently electronic waste/e-waste; which are dumped on land. These Solid Wastes are the source of disaster and it could be defined as man-made disaster inflicted on environment, whose impact is such that the society thus affected has to respond by taking immediate and serious measure including help from in and outside the community.Realizing the seriousness of the problem of solid waste management and therefore to regulatethe management and handling of the municipal solid waste, the draft of the Municipal SolidWastes (Management and Handling) Rules, 1999 were published by the Ministry of Environmentand Forest, Government of India vide No. S.O.783(E), dated the 27th September, 1999 in theGazette of India, Part II, Section 3 & sub section (ii) and finally, in exercise of the powersconferred by Section 3, 6 and 25 of the Environment (Protection) Act, 1986 (29 of 1986) it hasbeen notified as Municipal Solid Wastes (Management and Handling) Rules, 2000 vide no.S.O.908(B) dated the 25th

September, 2000.Keeping this in view, the Ministry of Environment & Forest, Govt. of India, has come forward inthe year 2003 with financial assistance for projects to strengthen the infrastructure of CentralPollution Control Board (CPCB) and the State Pollution Control Boards/ Pollution ControlCommittees in order to ensure effective implementation of the provisions laid down in the rulesrelated to Municipal Solid Waste and Bio-Medical Waste. Like other state boards, the West Bengal Pollution Control Board has been awarded the same project. Thus there should be growing harmony among scientists, resource managers, and Politicians so that at least some of the problems that we face can be solved.

2.OBJECTIVES:

1. To find out the Solid Waste sources and problems in Kaliyaganj Municipality
2. To give some recommendation and suggestion to reduce the problems.

3. `METHODOLOGY & DATA SOURCE

In all over India data have been collected and give the special emphasize on West Bengal. The collect the information about soild waste management in kaliyaganj municipality with the help of Municipality Author and working people and people of Municipality. The random sampling method has been used during survey and the statistical mean method has been used here. Different photographs have also been used here.

RESEARCH METHODOLOGY

The researcher conducted the research with Ilala Municipal Council. The field study aided the researcher to collect the raw primary data from different respondents.Data were collected both in primary and secondary data; in collecting primary data the researcher used numerous tools for primary data collection such as interview, questionnaire and observation. Secondary data were collected through documentary review.The field research was used to collect primary raw data; the methods which were used to collect the data were interview, observation and questionnaire. The interviews were both structured and unstructured so as to get first-hand information from the interview. A questionnaire is a written list of questions prepared in a series form by the researcher on a given legal problem that are sent to respondents. The researcher made use of this method in primary data collection in the field through commencing the process of discovery from the perspective of the respondent. This method was chosen due to the fact that questionnaires when carefully crafted and administered, they are very useful tool forgetting data from specific groups or people or entire populations on the identified legal problem. Questionnaires were both close-ended and open-ended, this tool were useful in time and financial management as well as enhanced the researcher in getting the relevant answers in accordance to the nature of the problem of the stu. The analysis of data was done qualitatively through translating; interpreting data into themes, the synthesis of themes were made by abstracting meanings from the themes and interpreting them focusing the meanings into research objectives.

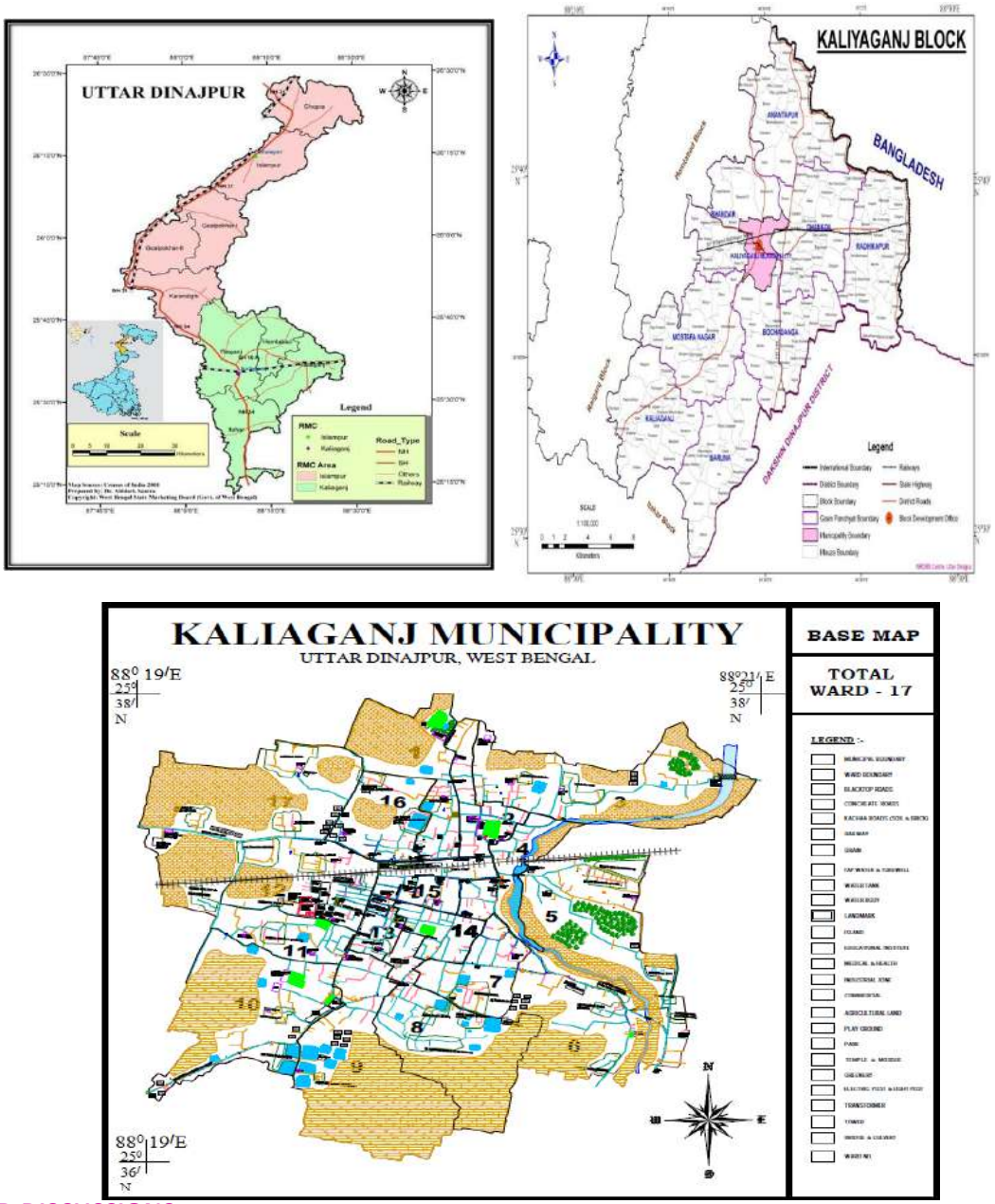
RESULT AND DISCUSSION:

REGIONAL IDENTITY OF THE STUDY AREA:

Kaliyaganj is one of the oldest towns situated within the eastern part of Raiganj subdivision and south-eastern corridor of Uttar Dinajpur district. Within the Kaliyaganj city, Kaliyaganj Municipality came out as a tiny Municipality only in the year 1987. Kaliyaganj Municipality shared its northern boundary with Bhandar G.P and southern boundary with Tarangapur village. Dhankoil village is situated in the eastern side of the Municipality. mahadebpur and Baghon villages are situated in the western side of the Municipality. Total geographic area of the Municipality is 11.67 sq Km which is divided inyo 17 administrative wards. Mean coordinates of the municipality being 25° 38' 0" North, 88° 19' 0" East. Mean height of the Municipality from the sea level is (+) 5.437 meters. There is one police station, namely Kaliyaganj, situated within the boundary of the Municipality. Kaliyaganj is conveniently connected with northern area of West

Bengal and north-eastern states and cities of India as the State Highway 10A is going through the heart of the city coming from Raiganj (Uttar Dinajpur) and going to Balurghat (DakshinDinajpur) and thereby Raiganj is placed as the common point to the connectivity through National Highway 34. It is also very well connected with the southern cities like Kolkata, Burdwan and many others via railways as it has got a railway station in the name of KaliyaganjPeople do not pay awareness while disposing the garbage ashes and other Solid Waste materials on open public space or in front or corner of their houses. With the drastic evolution of population number, their industrial activities and household activities generate a Solid Waste world with the collaboration with obnoxious colour, carton boxes, beverages, metals, glasses, plastics, mineral waste, and agricultural waste which pollutes the land-water and air and eventually give rise to various diseases.

Map 1 : Show the map of the study are



RESULT AND DISCUSSIONS:

Solid Waste means any garbage or refuse, sludge from a wastewater treatment plant, water supply treatment plant, or an air pollution control facility and other discarded material, including solid, liquid, semi-solid, or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations, and fromcommunity activities. Solid Waste does not include solid or dissolved materials in domestic sewage, solid or dissolved materials in irrigation return flows, or industrial discharges. The large scope of the term Solid Waste means that it must be managed in a variety of different ways and that various levels of government employ different policy instruments in order to accomplish this task. The increase in population and urbanization was also largely responsible for the increase in Solid Waste. Each household generates garbage or waste day in and day out.

Sources in Kalyaganj Municipality:

Solid Waste can be classified into different types depending on their source :

a) Household waste is generally classified as municipal waste,
b) Industrial waste as hazardous waste, and
c) Biomedical waste or hospital waste as infectious waste.

Municipal Solid Waste: Municipal Solid Waste (MSW), commonly known as trash or garbage, includes all everyday thrown away items from households, commercial and institutional entities, horticulture, and road sweeping. This includes items such as packaging, paper, cardboard, food scraps, plastic bags& containers, glass bottles, grass clippings, furniture, tires, electrical & electronic items, and metals.

Agricultural and Animal Waste: Agricultural waste include primary crop residues that remain in fields after harvest and secondary processing residues generated from the harvested portions of crops during food, feed, and fibre production. This is generated during the production and distribution through decomposition of food, vegetables, or meat, removal of non-usable parts, removal of substandard products, and spoiling due to substandard packaging. Thus agricultural waste is generated at all stages of food system including farming, storage, processing, and wholesaling.

Industrial Waste: It includes waste generated from industrial manufacturers of organic chemicals, inorganic chemicals, iron and steel, plastics and resins, stone, clay, glass, concrete, pulp and paper, food, and kindred products. Manage the industrial waste management units have to consider waste characterization and minimization methods, waste constituent information fact sheets, risk assessment tools, institutional mechanism/stakeholder partnership principles, safe and proper design guidelines, water (surface and ground) and air monitoring procedures, and facility pre- and post-closure recommendations.

Construction and Demolition Waste: Construction and Demolition waste includes debris generated during the construction, renovation, and demolition of buildings, roads, and bridges. This can be often bulky and heavy building materials consisting of concrete, building wood waste, asphalt from roads and roof shingles, drywallgypsum, metals, bricks, blocks, glass, plastics, building components like doors, windows, and fixtures, and trees, stumps, earth, and rock from construction and clearing sites.

Treatment Waste: Treatment waste consists of sludge, by-products, co-products, or metal scraps resulting from a facility or plant. Sludge is any solid, semisolid, or liquid waste generated from a municipal, commercial, or industrial wastewater treatment plant, water supply treatment plant, or air pollution control facility exclusive of the treated effluent from a wastewater treatment plant.

Special Waste: Special waste are 1) Cement kiln dust, 2) Mining waste, 3) oil and gas drilling mud and oil production brines, 4) beneficiation and processing waste from phosphate rock mining, 5) uranium waste, and 6) utility or fossil fuelcombustion waste.

Household's Hazardous Waste: This includes used and leftover household products that contain corrosive, toxic, ignitable, or reactive constituents. Examples are medical waste, used oil, paints, cleaners, batteries, pesticides, and light bulbs/lamps. Since these contain potentially hazardous ingredients, improper disposal can lead to human health risks and environmental pollution.

Industrial Hazardous Waste: The primary generators of hazardous waste in any region are industrial facilities, manufacturing and processing units, workshops and maintenance units, nuclear facilities, chemical units, etc. The following section briefly describes the four main types of industrial hazardous waste.

Medical Waste*:*Medical waste and biomedical waste consist of all waste materials generated at health care facilities including hospitals, clinics, offices of physicians, dentists, and veterinarians, blood banks, home health care facilities, funeral homes, Biomedical waste, (BMW), consists of solids, liquids, sharps, and laboratory waste that are potentially infectious or dangerous and are considered bio-waste. It must be properly managed to protect the general public, specifically healthcare and sanitation workers who are regularly exposed to biomedical waste as an occupational hazard. Biomedical waste differs from other types of hazardous waste, such as industrial waste, in that it comes from biological sources or is used in the diagnosis, prevention, or treatment of diseases

1.3 Effects of Solid Waste in urban area

Solid wastes released by cities are referred to as municipal solid waste (MSW). Solidwaste affect environment in various ways especially when not properly managed, thefollowing are the impact of solid waste on environment.

1.4 Effect of Solid Waste on Terrestrial and Aquatic Life

The terrestrial organisms such as plants and animals are always exposed to risks of healthand life due to pollution related to solid waste accumulation. For instance; - animals suchas cows and goats die of eating plastic wastes.

1.5 Effect of Solid Waste on Health

Domestic and Industrial solid wastes are dumped in residential areas, which causesunhygienic conditions and ultimately results in outbreak of diseases such as cholera andmalaria.

Management byKaliaganj Municipality:

A) Municipal Level Administration:

Management Regulation relating to solid waste disposal and recycling would be adopted by the respect Municipal Boards after exhaustive discussion with all concerned and the board of councilors meetings in due time.

B) Institutional Strengthening & Human Resources Development:

It is necessary to provide adequate training to all the levels of staff engaged in SWM services. The lower level staff such as sweepers, sanitation supervisors up to the level of Sanitary sub-inspectors would be given training locally in various aspects like storage, segregation of waste and primary collection of waste etc. whereas the Sanitary Inspectors (SI) and above will be given training in modern technologies of waste management, transportation, planning, personnel management programme within and outside the town, city or state. The senior officers of SWM department would be given adequate training through workshops and visits to various parts of the country and abroad.

C) Decentralization of Administration:

SWM services can be performed effectively only if the Ward level, second at the Zone level and third at the city or Town level. For creating a competitive environment in regard to performance of SWM systems “Cleanliness Awards” would be given each year to the best performing wards.

i) Ward Level Administration:

The ward level administration would be fully responsible for ensuring storage of segregated waste at source, primary collection of waste, street sweeping and taking the waste to the bulk community waste

storage site etc. The cleaning of each street, lane, by lane, markets etc. would be regularly supervised by the ward level supervisors. Presence of all SWM officers of the Ward in the field during morning hours is most essential. Besides grievance redressal system has to be in place in each ward.

ii) Zonal Administration:

Administrative zones will be made for a group of wards. The zonal administration would effectively supervise and support the work of the ward administration and also provide zonal level support such as construction and upkeep of flooring under the communal waste storage sites transportation of waste from the communal storage sites to the transfer station, processing plant or to the disposal sites as will be determined by the local body. If the zones are not allotted adequate vehicles for the transportation of waste due to paucity of vehicles, the transportation of waste will be coordinated centrally for the optimum utilization of the fleet of vehicles in 2 or 3 shifts

City / Town Level Administration:

The city / town level administration would supervise and support the zonal administration and in cases where the fleet of vehicles is not decentralized at the zonal level, the central SWM Department would look after the transportation of waste from the community waste storage sits on a daily basis. The Central SWM Department would be responsible for construction and upkeep of transfer stations, setting up and maintenance of processing plants, incineration plants and vehicles as well as for managing the disposal of waste at the landfill sites in an environmentally acceptable manner.

The central SWM department would also be responsible for the procurement of vehicles, equipment and land for processing and disposal of waste. As a head office it would take policy decisions and co-ordinate the activities of all the zones and the wards and be answerable to the Chief Executive and elected body for the efficient functioning of the department. It would look after the recruitment of manpower, human resources development, training etc.

Plate : Waste carrying vehicle to the dumping ground, KaliyaganjMunicipality, Uttar Dinajpur District, West Bengal

iii) Interactive meets and communication:

State Governments would organize interactive meets for the subordinate officers in charge of SWM in various local bodies for exchange of information and sharing of experiences.

D) Planning and monitoring unit for Municipal Towns:

The provision of SWM infrastructure like waste collection, temporary storage, transfer, processing and disposal of waste would be made mandatory precondition in urban planning.

So there would be continuous planning and monitoring activity within solid management programme. A planning unit headed by a person having qualification and experience in Public Health Engineering under the control of Municipal Engineering Directorate, Department of Municipal Affairs, Govt. of India, and State Govt. would be created to perform this activity. Planning Unit would analyze and compare various level of mechanization and labor involvement and feed back the analyzed data to the municipalities for implementations and / or modification. This unit will also monitor the production and quality control compost manure and also render necessary help for marketing the product for the municipalities.

3.1 Preparation of land use and land cover map:

The study area has been segregated in five land use and land cover classes like urban built up area, homestead with plantation,crop land ,Social Forest ,mixed built up etc which are shown by different color shade.

Enormous volume of waste-supplies are generated from the houses of this region like: plastics, plastic-cans, glass bottles, spoil vegetables fruits, ravage of fishes, eggs, pitch boards, expire medicine waste, clothing, e-waste, fluorescent, tubes, bulbs, paints, chemicals, fertilizer and pesticide containers, spray cans, batteries, soft drink cans from households; those are more hazardous and toxic. This study area comprises of major area having crowded settlement drawing. People of this area suffer a lot by diverse types of waste in their daily speedy life. In this study area, most of the households arrange their waste materials in their house corners or nearer to the dustbins. When these substances are gathered in disposal place they make fire on it. Therefore it acts as the source of air pollution or green-house upshot in micro level. In *chirail para, Lakshmi para*, Seth Colony,Collage para ,people partly utilize dustbin to dispose their waste items. On the lop side Mistripara,Sarojoni,sahapara,accumulate their waste materials nearer to the open land which is the sources of Solid Waste troubles.The present Municipality cooperation is not too modernized in this area to get rid of these waste or to create aware among population of this area.

At present in Municipalty area per capita solid waste generation per day is 112.45gms and the estimated generation of solid waste per day is 7.00MTs , 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 category hospital and clinic have separate contribution to solid waste generation.

1.2 SOURCES OF SOLID WASTE

- **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.
- **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.
- **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.
- **Waste from Hotels/Restaurants/Eating stalls**: Hotels and Restaurants generate both degradable and nondegradable 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.

- **Waste generated by street hawkers:** Street food vendors and hawkers generate large quantities of waste particularly food waste and plastic paper plates
- **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 malodor near these premises. No paper collection or removal is practiced and hence the waste rots in the premises itself.

EFFECT OF SOLID WASTE IN MUNICIPALITY AREA:

The uncontrolled Solid Waste creates a lot of problems. Uncollected waste frequently ends in drains, causing blockage which upshot in flooding and unhealthy state. Flies breed in some constituents of Solid Waste and they are very efficient vectors that increase diseases. Mosquitoes breeds in blocked drains and in rain water that is retained in discarded canes, tires and other objects. Mosquitoes spread diseases, including malaria and dengue. Rats find shelters and foods in waste dumps. Rats eat and ruin foods, multiply diseases, spoil electrical cables, and impose horrible bites. The open burning of waste generate air pollution; the yield of burning include dioxins which are chiefly hazardous. Uncollected waste degrades the urban environment, discouraging efforts to keep streets and open space in a clean and attractive condition. Plastic bags are a particular aesthetic nuisance and they cause the death of grazing animals when they eat it. Waste collection workers face occupation hazards, including strains from lifting, injuries from sharp objects and traffic accidents. Dumps of waste and abandoned vehicles block streets and other access ways. Dangerous items (such as broken glass, razors blades, hypodermic needles, other healthcare waste aerosols-cans, potentially explosive containers and chemicals from industries) make risks of injury or poisoning, particularly to children and people who arrange the waste. Heavy refuse collection trucks can cause significant damage to the surfaces of roads that were not designed for such weights. When waste items are recycled without being cleaned, effectively or sterilized can transmit infection to later users for example, bottles and medical supplies. Polluted water (leached) flowing from waste dumps and disposal sites can cause of serious pollution for water supplies. Chemical waste (especially persistent organics) may be fatal or have series effects if ingested, inhaled or touched and can cause widespread pollution of water supplies.. Methane (one of the main components of landfill gas) is much more effective than carbon dioxide as a greenhouse gas, leading to climate change. Fires on disposal sites can cause of major air pollution, causing illness and reducing visibility, making disposal sites dangerously unstable, causing explosion of canes and possibly spreading to adjacent property. Former disposal sites provide very poor foundation support for large buildings, so buildings constructions on former sites are prone to collapse. The Solid Waste are collected from open dumps near all houses in this area. Taken as a whole result of Solid Waste pollution in Kaliyaganj Municipality can be seen in Table

Plate : polluted water by solid waste

Plate: air pollution by burning solid waste

Table 3: Result of Solid Waste pollution inKaliyaganj

Name of the diseases	No. of affected person	Reasons
Asthma	10	Toxic gases released from incineration
Vomiting	18	Bacterial infection
Gastroentitis	60	Polluted water, viral infection
High fever	30	viral infection emerge from dumping ground
Dysentery	25	Bacteria virus infection
Chest pain	6	Dust
Skin allergy	8	Sewage, garbage, grill factory(toxic co lour)
Abdomen pain	7	Poisons releases from open landfill area
Diarrho	30	Polluted water

Source: field survey,2018

Management:

Kaliyaganj though is not a big town in size, it is one of the oldest towns of undivided Bengal under erstwhile Dinajpur district. It was used as corridor in between Bihar and Dhaka (now in Bangladesh) through railway connecting Coochbehar (Gitaldah) and Kolkata (Sealdah) and maintaining the balance of trade of Bihar, Uttar Pradesh, Assam including East Bangladesh. It is said that Kaliyaganj is the immediate next to Kanpur(UP) as business center of Rice, Mustard Oil, Jute and Wheat & maize. After the partition of Bangladesh in 1947, the Dinajpur district was divided into two parts out of which one part was known as West Dinajpur and another part was emerged with East Bengal, now known as Bangladesh. After recognition of Uttar Dinajpurdistrict on 1st April, 1994, Kaliyaganj is known as one of the important towns of the district just after the district town located at Raiganj.

The Kaliyaganj Municipality was formed in 1987 comprising of Akhanagar (JL No. 96), Chairail (JL no. 102), Chakmajlispur (JL No. 103), Majlispur (JL No. 104), Dhankoil (Jl No. 84), Rasidpur (JL No. 84), Rasidpur (JL No. 85), Hariharpur (JL No. 86), Mahadevpur (JL No. 99), Ratan (JL No. 123).

Table5 :MSW generation, collection status in Kaliyaganj Municipality

Name of the Municipaliy	year	Population	MSU Generation/Day(in MT)	Per capita waste Generation(gms /day	MSU Collection/Day (in MT)	Collection efficiency (%)	Total no of Wards	Collection Method	
								Door-step	Road side
Kaliyaganj	2001	47,639	5.00	104.96	4.00	80	17	Nill	All-Daily
	2011	53350	7.00	112.45	6.00	85	17	Daily	All-Daily

Source:Office of the Kaliaganj Municipality, 2018

Table 6 :MSW Transportation and Disposal Status:

Name of Municipality	Year	MSW Generation/ day	Collection of MSW			Transportation of MSW		Disposal Land	
Kaliyaganj			Tricycle	Hand cart	Trailer	No.of Compactor	No. of Tractor	Existing land	New land identified
	2001	5.00	Nill	24	23	Nill	03	2.7Acres	Nill
	2011	7.00	Nill	45	35	1	11	3.00	Yes

Source: Office of the Kaliaganj Municipality, 2018

Fig:solid waste collect by compactor

Fig:solid waste collect by trailer

Waste collection is the collection of solid waste from point of production (residential, industrial commercial, institutional) to the point of treatment or disposal. Collection of the Solid Waste by the total 110 Eco-friends'. From Kaliyganj town they move up to Monibag, PurbaAkhanagar, Seth Colony, Sahapara ,Masjid Para, Chiral Para, Collage para,Municipal solid waste is collected in several ways:

- **House-to-House:** Waste collectors visit each individual house to collect garbage. The user generally pays a fee for this service.
- **Community Bins**: Users bring their garbage to community bins that are placed at fixed points in a neighborhood or locality. MSW is picked up by the municipality, or its designate, according to a set schedule.

- **Curbside Pick-Up**: Users leave their garbage directly outside their homes according to a garbage pick-up schedule set with the local authorities (secondary house-tohouse collectors not typical).
- **Self Delivered:** Generators deliver the waste directly to disposal sites or transfer stations, or hire third-party operators (or the municipality**).**
- **Contracted or Delegated Service:** Businesses hire firms (or municipality with municipal facilities) who arrange collection schedules and charges withcustomers. Municipalities often license private operators and may designate collection areas to encourage collection efficiencies.

Private participation is very essential to complement Government function.fortunatelyaspar as solid waste is concern there is a parallel sector in form of waste collect and scrap dealers .people go house to house buy old news paper ,scrap iron ,aluminum and others ,its exchange by money which further bought by the dealer of scrap beside the scrap sellers there are other people who exchange old plastic goods for the new one in forum of steamers.

Solid Waste is collected from different dumping portions of Kaliyaganj Municipality. This also extended to the surrounding Raiganj block. *Environment-friends* collect waste in different ways.

1. Some of them follows the barter system i.e. buys some Solid Waste in exchange of goods like steel-dishes, glasses, or foods like *prickle,* biscuits, and chocolates etc., 2. Buy Solid Waste in-exchange of money 3. Collect the stray Solid Waste in and around and those '*Environment-friends*' are collecting this called as *Kurani.* To collect the waste, *Environment-friends* follow different methods to cover distance for example, 1.Collection of waste with the help of *bicycle-Dali* system (plate 31)*;* 2.Waste collection by *shoulder-dali* system (plate32); 3.Waste collection by *waste-bag* system (plate 32 &33); 4.In recent some *Environment-friends* collect waste by Waste-Vans .

At present there are one waste disposal site under the Kaliyaganj Municipality which are open dumping and partly covering with debris. This dumping ground is located at covering an area around 4 bigha .Daily average disposed of solid waste to these sites is 100-150 MT/Day

Report from Private Entrepreneurs, based on average collections of total 17 ward Solid Waste INTERMEDIATE STAGe, Collected by author, July 2018. This type of report cannot berecorded under Municipality authority and This all data are the pioneer primary data.

Name of Solid Waste (in group/ category)	**Total quantities (average/week)**			**Collection on the basis of per week Solid Waste collection (projection)**	
	In Summer	**In Winter**	**Average in week**	**Average in Month (production of each week X 4)**	**Average in a Year (production of each month X 12)**
Plastic bottles	2100 kg.	900 kg.	1500kg.	6000kg.	72000 kg.
Black sole of shoes or Sandals	250 kg.	100 kg.	125 kg.	500kg.	6000 kg.
Foam	360 kg.	270 kg.	315 kg.	1260kg.	15120 kg.
Paper	900kg.	900kg.	900 kg.	3600kg.	43200 kg.
Carton	1500 kg.	1500 kg.	1500 kg.	6000kg.	72000 kg.
Scrap iron	2600kg.	2600kg.	2600 kg.	10400kg.	124800 kg.
tin	1600 kg.	1600 kg.	1600 kg.	6400kg.	76800 kg.
Tube	230kg.	90 kg.	160 kg.	640kg.	76880 kg.
Bear Bottle	2000 pies	900 pies	1450 pies	5800 pies	69600 pies
Books and Notebooks	550 kg.	520 kg.	535 kg.	2140kg.	25680 kg.
LD	1700 kg.	1700 kg.	1700 kg.	6800kg.	81600 kg.
Dalda	1350 kg.	1350 kg.	1350 kg.	5400kg.	64800 kg.

Glass	830 kg.	820 kg.	830 kg.	3320kg.	39840 kg.
Iron chair, utensils	20 tons	18 tons	19 tons	76 tons	912 tons

Source: Field survey, 2018

2.5 SEPERATION OF SOLID WASTE: ON THE BASIS OF INDIVIDUAL CHARECTERISTIC

After accumulation of all Solid Waste in a distinct area under Intermediate ownerships, *Environment-friends* are engaged to separate all the items on the basis of individual characteristic. During separation they follow specific category of Solid Waste like *gaokhata, HM, LD, foam, guria, potpoti, carton, broken glass, dalda, bosta, Kuchka*, copper-alluminum and *Chamra-khuli-har* etc. ().

Table8 :Collected Different Types of Solid Waste to differentiate and integrate in KaliyaganjMunicpality

Types of Solid Waste	**Local name of group of Solid Waste**	**Production after recycle**	**Recycling center at**
Tube of Motor-Bike, Taxi, Auto, Lori, Bus	Tube	Door mat	Baharampur
Non broken Bear/foreign liquor bottle	Bear Bottle	Wash-purify and reuse for bear faking	Kalyani (N.24 Paragan)Kingfisher factory
Scrap copper, brass, Aluminium items	Tama-pitol-aluminium	Copper-brass-aluminiun	**Kolkata**

SOURCE: Field survey ,2018

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