CHAPTER-7

WASTE MANAGEMENT STRATEGIES AND COMBAT PLAN

The existing Solid waste management system in the study area is found inefficient with respect to waste generation. Primary and Secondary Collection, transportation and open dumping are the activities practiced in a non-technical manner. The annual waste generation increases in proportion to growth and an increase of population in the city. The insufficient collection and inappropriate disposal of solid waste represent a source of land, water and air pollution which is direct threat to environment. Waste management involves managing activities associated with generation, collection, transportation and disposal of waste. Several studies have been carried out and recommendation and combat plan have been designed. However, waste is still a problem. Developed countries have adopted sophisticated management practices but situation in developing countries is different. The management strategies should ensure maximum safety and it should be less expensive. Any plan should be designed with respect to, ecologically viable, economically feasible and socially acceptable. The best way to manage the solid waste is the reduction of waste at sources but the given state of consumerism and general apathy towards the environment has forced the planners and managers to evolve strategy so as the ill effect of solid waste on environment and human health can be minimized. The quality and quantity of municipal solid waste generated by a particular community will vary according to socio-economic status, lifestyle, food habit, living pattern, urban land use, topography, population and commercial activities. Therefore, it is very necessary to explore all the aspect with reference to different vulnerability criteria in the city in their spatial perspective.

7.1 Identification of Vulnerable Areas for the purpose of Planning

Identification of vulnerable Areas with reference to solid waste problem in different administrate Zones of Kanpur City have been synthesized on the basis of super imposition of nine vulnerability assessment criteria. In the present study an attempt have been made to examine the improper and inadequate disposal of solid waste which has resulted in accumulation or heaps of solid waste in the open roads and improper drainage system choked with solid waste which resulted water logging in many areas. There are various other variables have been processes in order to examine the level and intensity of vulnerability with reference to solid waste problem in the study area. In order to arrive composite figure five categories have been made. i.e. very high vulnerable areas, High Vulnerable areas, Moderate vulnerable areas, Low vulnerable areas and very low vulnerable areas.
CUMULATIVE VIEW OF VULNERABILITY OF SOLID WASTE PROBLEM IN KANPUR CITY
2010

Composite Score
Very High 27.60 - 32.00
High 23.20 - 27.60
Medium 18.80 - 23.20
Low 14.40 - 18.80
Very Low 10.00 - 14.40
Data Not Available

Source: Based on Data Obtained From Kanpur Nagar Nigam

Figure No. 7.1
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<th>Category</th>
<th>Number of Wards</th>
<th>Population</th>
<th>%</th>
<th>Area</th>
<th>%</th>
<th>Name of Wards</th>
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<td>30.23</td>
<td>10.36</td>
<td>Maheshwari Mohal, Nazir Bagh, Jajmau north, Naubasta East, Karrhai,Naubasta west, Tilak Nagar/Swaroop Nagar, Talaq Mohal,Gwaltoli, Barra Gaon, Barra-south, Kalyanpur, Nawabganj, Rawatpur Gaon</td>
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<tr>
<td>High</td>
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<td>413857</td>
<td>12.12</td>
<td>31.07</td>
<td>10.65</td>
<td>Laxmi purwa, Sisamau south, Patkapur, Sujatganj Gaon/Shyam nagar, Usmanpur, Old Kanpur, Nehru Nagar, Prem Nagar, Becon Ganj, Saraimeta/ Panki Industrial Estate All, Maswanpur, Kalyanpur Naubasta/Khyora</td>
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<td>13.05</td>
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<td>23.92</td>
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<td>Harbansh Mohal, Collectorganj, Civil lines, Chaman Ganj, Generalganj, Chakeri, Chandari, Pasupati Nagar, Yashoda Nagar, Block-P, Kidwai Nagar sabji mandi, Kidwai Nagar Block-North, Juhu/ Vinoba Nagar, Parmat, Ashok Nagar, Gwaltoli/ Satarganj, Barra West, Param Purwa, Juhu, Dabauli Gaon, Panki Katare, Ratanpur, Kalpi, Gujaini Gaon/Gujaini Colony, Ravidas Puram, Garariyan Purwa/Fazal Ganj, Govind Nagar north, Vinayakpur/ Panchvati, Nankari, Shastri Nagar Colony, Azad Nagar/Vishnupuri, Vijay Nagar</td>
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<tr>
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<td>Anwarganj, Dalel Purwa, Chatai Mohal, Chowk Sarafa, Gandhi Gram, Hanspuram, Krishna Nagar Block-11, Dhehi sujanpur, Yashoda Nagar, West, Sanigavan, Ghaus Khera/Safipur, Transport Nagar, Babu Purwa, Babu Purwa (L., Colony), Munshi purwa, Lal, Hari, Peeli Labour Colony Juhi, Barra East, Begum Purwa, Khalasi Line, Arya Nagar/Benajhabar, Chunni Ganj, Panki Katare, Ratanpur, Kalpi, Bhannanapurwa, Kaushalpur, Govind Nagar, Harijan Basti, Naseemabad, Govind Nagar outh, Viddharthi Market/Nirala Nagar, Kakadev gaon, P-1 Block $ Shivpuri, Pandav Nagar H-1, H-2 Block /Sarvodya nagar, L-Block, P-Block, M-Block, Kakadev$ Sai Prakash Nagar, Naramau Bangar/ Akbarpur, Sarojani Nagar, Kalyanpur/ Awas Vikas, Kakadev/ Sarvodaya Nagar/ Ambedkar nagar, Geeta Nagar/Sharda Nagar</td>
</tr>
</tbody>
</table>

Source: Computed on the basis of data obtained from Kanpur Nagar Nigam (2010)
Very Highly Vulnerable Areas

On the basis of nine selected criteria for Vulnerability assessment. There are fourteen wards have been identified under very high vulnerable areas namely Maheshwari Mohal, Nazir Bagh, Jajmau North, Naubasta East, Karrahi, Naubasta West, Tilak Nagar, Talaq Mohal, Gwaltoli, Barra Gaon, Barra South, Kalyanpur, Nawabganj & Rawatpur Gaon. It has been identified that Nawab Ganj, Gawaltoli and Jajmau reported problem related to open drains where most of the localities are at Under risk of health hazards. The problem of water logging in these areas is very serious because in these areas waste water runs towards the low lying areas and causes water logging due to accumulation of polythene in Nalas. The length of open drainage in more in these wards. Most of the settlement along the Nala's are under at risk of deseases. These are Nine Other Wards namely Maheshwari Mohal, Naubasta West, Karrahi, Gwaltli, Talaq Mohal, Barra South, Barra Gaon, Kalyanpur and Rawatpur felt major Problem of population bin ratio. These areas are having high to very high population. There is acute shortage of bins in respect of population. Nazir bagh, Naubasta East, Jajmau North, Naubasta West, Karrahi, Gwaltli, Kalyanpur, Barra South, Barra Gaon, Talaq Mohal and Tilak Nagar (Swaroop Nagar) also reported for imbalance between sweeper and population ratio. These areas are having inadequate number of sweeper to serve the whole population. Due to this inadequacy of man power there is problem of waste disposal problem. Door to door collection of solid waste suffers and waste dumps can be seen on open roads. Nazir Bagh, Naubasta West and Tilak Nagar also reported for maximum length of road serve by one sweeper. Naubasta (East), Gwaltli, Barra (South) and Rawatpur Gaon felt very serious problem of polythene generation.

These areas are having high number of households. In these areas house density is more as compares to other wards. Maheshwari Mohal, Nazir bagh, Naubasta East, Jajmau South, Naubasta West, karrahi, Tilak Nagar, Talaq Mohal, Barra South, Kalyanpur and Rawatpur also reported for very high quantity of waste generation due high population and high number of house hold. These areas characterized by inadequate and regular collection and disposal of solid waste. These wards reported regular problems of solid waste disposal and seasonal/ occasional
water logging problem. Due to faulty natural drainage the city remains water logged and choked with silt and polythene and stagnant waste water with polythene and other non-biodegradable waste which provides breeding ground for mosquitoes.

**Highly Vulnerable Areas**

The second category of vulnerable wards comprises twelve wards namely Laxmipur, Sisamau South, Patkapur, Sujat Ganjaon, Usmanpur, Old Kanpur, Nehru Nagar, Prem Nagar, Bacanunj, Sarai Mita, Maswanpur and Kalyanpur Naubasta. These areas are identified on basis of selected criteria and field survey it has been observed that these areas are marked with regular problem of solid waste disposal problems where collection and disposal of garbage is not well organized waste dumps can be seen along the roads Patkapur and Usman pura wards noted for acute problem of open drains/nala/s which is directly threat to health problem those who are residing along the open drain/nala's as compare to other wards. Old Kanpur and Nehru Nagar wards reported for absence or inadequate number of bins in various localities of the wards. Sisamau South, Sujat Ganj Gaon, Shyam Nagar, Old Kanpur, Nehru Nagar and Bacan Ganj also reported for inadequate number of sweeper to serve the population. There are five wards reported for having high length of road serve by one sweeper these wards are Laxmipurwa, Sisamau South, Sujat Ganj, Sarai Meeta and Maswanpur. Patkapur, Old Kanpur area, Nehru Nagar, Kalyanpur Nabausta felt problem of generation of polythene due to presence of more number of households in the area.

Whereas Laxmipurwa, Sesamau South, Patkapur, Sujat Ganj and Nehru Nagar reported for high waste generation due high population particularly in Patkapur, Prem Nagar and Becan Ganj. Rain and Waste water from higher areas flows down. Problem of water logging is more in low lying areas. as compare to Old Kanpur and Kalyanpur (Naubasta) which is located on higher altitude as compare to other wards.
Moderate Vulnerable Areas

In this category twenty one wards have been identified on the basis of nature and characteristics of the study area. These are Raipurwa, Coperganj, Parade, Danakhori, Ompurwa, Jajmau South, Tiwari Pur, Harjinder Nagar, Barra World Bank, K-Block Kidwai Nagar, Vasant Vihar, Baqar Ganj, Bingawan, Makrawatganj, Jawahar Nagar, Sisamau North, Gandhi Nagar, Colonel Ganj, Ratan Lal Nagar, Nirala Nagar and Lajpat Nagar,. These wards of the city are also not served properly by the municipality in these wards mostly waste is collected in two to three day gap. Few areas where higher income group population are residing service is better as compare to other wards. Harjindar Nagar, Jajmau South, Tiwaripur, K-Block Kidwai Nagar, Vasant Vihar, Gandhi Nagar and Nirala Nagar are facing acute problem under the criteria of presence of open drains/Nala's. The length of open drain's/Nala's is more as compare to other wards. Those peoples are residing along the open Nala's are having more risk of diseases as compare to other localities of the study area. Dana Khori, Jawahar Nagar, Sisamau North and Colonel Ganj reported for having inadequate number of bins and area is characterized by heaps of solid waste lying along the roads or in open plots and over flowing municipal waste bins, a sign of municipalities inefficiency in managing the solid waste in the area Raipurwa, Sisamau North and Colonel Ganj reported for having inadequate number of sweeper to serve these wards. Raipurwa, Dhanakhori, K-Block Kidwai Nagar, Vasant Vihar, Maksawat Ganj reported for having of maximum length of road serve by one sweeper as compare to other wards Ompurwa, Barra world Bank, Sisamau North generate more polythene as compare to other localities. These areas are having high density of population whereas Ratanlal Nagar, Raipurwa, Coperganj, Tiwari pur, Jawahar Nagar is noted for high waste generation due high number of population as compare to other localities in this category. Danakhori, Harjindar Nagar, Bacon Ganj, Colonel Ganj, Lajpat Nagar, Makrawat Ganj and Jawahar Nagar having more density of population as compare to other localities like Jajmau South, Jarauli, Makrawat Ganj and Jawahar Nagar having higher relative relief as compare to other localitites. These areas are having moderate risk of vulnerability.
Low Vulnerable Areas

In this category twenty eight wards have been identified these are Harbansh Mohal, Collector Ganj, Civil Lines, Chaman Ganj, General Ganj, Chakeri, Chandari, Pashupati Nagar, Yashoda Nagar, Kidwai Nagar, Sabzi Mandi, Kidwai Nagar North Block, Juhi, Parmath, Ashok Nagar, Gwal Toli, Barra West, Daboli Gaon, Panki Katra, Gujaini Colony, Ravidas Puram, Gararian Purwa, Govind Nagar North, Vinayak pur, Nankari, Shastri Nagar, Azad Nagar and Vijai Nagar. These wards reported for having low category of vulnerability of solid waste problem.

In this category civil lines, Juhi, Vinoba Nagar, K-Block Kidwai Nagar is noted for presence of open drain/Nala's. In low lying areas there is acute problem of water logging particularly in rainy season. General Ganj, Chakeri, Chaman Ganj, Collector Ganj, Yashoda Nagar are having inadequate number of bins as compare to other localities. Yashoda Nagar, Panki Katra and Gujaini Gaon registered inadequate number of sweeper to serve the population K-Block Kidwai Nagar, Parmet, Ashok Nagar, Pasupati Nagar, Yashoda Nagar, Gwal Toli, Sujat Ganj and Dabauli Gaon is noted for having maximum length of road is served by one sweeper. Civil Lines, Govind Nagar North, Yashoda Nagar, Vijai Nagar, Nankari and Shastri Nagar generate more polythene as compare to other localities due to high number of household as compare to other areas. Harbansh Mohal, Collector Ganj and General Ganj is noted for high waste generation here Collector Ganj, Pasupati Nagar, Chandari, Vijai Nagar, Shastri Nagar, Chaman Ganj, Yashoda Nagar and Azad Nagar are noted for high density of population. Civil Lines, Parmat, Gwal Toli, Sujat Ganj, Azad Nagar, Vishnupuri, Chaman Ganj, General Ganj, Chakeri, Gujaini Gaon and Ravidaspur are situated in low lying areas having more risk of water logging as compare to other localities.

Very Low Vulnerable Areas

In this category there are thirty five wards have been identified these are namely Anwar Ganj, Dalelpurwa, Chatai Mohal, Chaowk Sarrafa, Gandhi Gram, Hanspuram, Krishna Nagar, Delhi Sujan pur, Yashoda Nagar West, Saniyawa, Gaukhera, Transport Nagar, Babu Purwa Labor Colony, Munshi purwa, Lal Hari Peeli Labour Colony, Juhi, Barra east, Begam Purwa, Khalasi Line, Arya Nagar,
Chunni Ganj, Panki Katra, Dhanna Purwa, Kaushal puri, Govind Nagar, Govind Nagar South, Naseemabad, Kakadev Gaon, Pandav Nagar, Jai Prakash Nagar, Nasa Mau Bangas, Sarojni Nagar, Kalyanpur, Saryoday Nagar & Geeta Nagar.

In this category Krishna Nagar, Juhi, Anwar Ganj, Chatai Mohal, Barra east, Govind Nagar reported for having presence of open drains/Nala's which poses various problem during rains. Whereas sanigawan and Chaman Ganj are noted for having inadequate number of bins in the area as compare to other localities. Yashoda Nagar Block P is noted for less number of sweeper to serve the population and area. Delhi Sujanpur, Krishna Nagar Block, Hanspuram, Barra east, Govind Nagar and Harijan Basti localities noted for maximum length of road served by one sweeper sanigawan, Gaukhera, Sufipur, Yashoda Nagar, Khalasi Line, L-Block and Kakadev areas generates more polythene. In these areas household density is reported more as compare to other localities. Chaman Ganj is noted for high waste generation due to high population as compare to other wards. Munnipurwa, Naseemabad, Sarojni Nagar, Geeta Nagar, Dalel purwa, Gaukhera, L-M- Block and Kakadev Gaon registered high density of population Chowk Sarrafa, Sanigawa, Hanspuram, Barra East, Khalasi Line, Arya Nagar and Naramau situated on having moderate relative relief as compare to surrounding areas. These wards having low risk of vulnerability.

7.2 Proposed Strategy for Spatial Planning and Management of Solid Waste Problem in Kanpur City.

Planning and Strategy for spatial planning is urban area is the conscious process for meeting future requirement. Municipal Solid waste management involves activities associated with generation storage, collection, transfer and transport, processing, recovery and disposal of solid waste which is environmentally compatible adopting principles of economy aesthetics, energy and conservation. It encompasses planning, organization, administrative, financial, legal and engineering aspects, involving inter-disciplinary relationship. Planning for urban solid waste management requires an assessment of many complex interaction among collecton system, transportation system, Land use pattern, urban growth and development and public health consideration. In appropriate management of Urban Solid Waste not only
increases the pollution to the environment but also threatens human health through its
collection, transfer and disposal processes.

A step wise approach for safe and efficient collection, transfer, storage, transportation and disposal of municipal solid waste for Kanpur city is being proposed.

7.2.1 Primary Waste Collection System

The primary waste collection system should be based on the principal of segregation of waste at the source into three main type i.e. biodegradable, non-biodegradable and recyclable. The following approach needs to be adopted by the residents as well as the K.N.N. personnel for the purpose of primary waste collection.

- The waste will be sorted out at the source point in three separate close bins, green for biodegradable, blue for non-biodegradable and yellow for recyclable.
- Sanitation workers must be collect waste on day to day basis in two separate bins (green bins and blue bins). This collection must be done by rickshaw trolley or wheel barrows.
- The waste collectors will transfer biodegradable and non biodegradable waste to the secondary waste collection point and transferred to dhalaos/container assigned for each of these waste.
- The residents must handover the recyclable to the recyclable waste collectors or rag pickers
- The rag pickers should collect waste in yellow bins and transport them to a common place identified by the K.N.N. in each sanitary ward.
- Recognize the allocation of sweepers over the city in relation to work load on the basis of vulnerable areas contracted out. Establishment of an optimal sweeping route. Re-establishment of responsibility over collection point areas.
- There is need to enhance performance of municipal sweeper by improved monitoring of attendance, monitoring of performance and of working hours will be help out to create a service minded working culture in the city.
- There is need of educated and trained sweepers (and other employees).
There is need to well equipped employees having with sufficient, suitable and adequate equipment like tricycle or well designed trolleys for long distance travel, to increase performance and working condition.

Kanpur Nagar Nigam Safai Karamcharies must perform street sweeping on a day to day basis and segregate the work collected into biodegradable, non-biodegradable and recyclable waste bins.

The door to door collection of waste shall be done on a day to day basis between 7.00 AM to 2.00 PM The K.N.N. shall ensure that infrastructure is made available for under taking this activity in compliance with the MSW Rule 2000. The infrastructure is calculated at ward level. It is proposed to use Rickshaws for door to door collection of waste. It is proposed to have a Rickshaw with six 50 litre bins for door to door collection of waste. Among 6 bins, 3 bins for biodegradable waste 2 bins for inert and mixed waste and 1 bin for recyclable waste.

7.2.2 Secondary Waste Collection System

The following criteria were followed to recommend suitable waste containers for biodegradable and non biodegradable wastes at each of the secondary waste collection points.

- The biodegradable wastes shall be cleared every day to avoid foul smell and degradation of wastes.
- The non biodegradable waste shall be cleared once in two days.
- It is proposed to provide secondary collection facility for biodegradable and non biodegradable waste. The recyclables waste will be sold directly in the market by waste collection.
- MSW at every secondary collection point shall be stored in two separate covered containers green for biodegradable and black for non biodegradable.
- The sweeper shall not travel more than 250 m to dispose off primary collection waste. Therefore distance between two secondary waste collection locations shall not be more than 500m.
- The bin design and strength shall be able to facilitate its hydraulic lifting by transportation vehicle.
• The secondary waste collectors shall be well equipped to avoid direct contact with waste.

7.2.3 Waste Transportation

The K.N.N. workers shall transport the biodegradable waste from secondary collection points to designated composting site on a day to day basis. The transportation shall be done in two shifts - 7.00 AM and 3.00 PM and between 4.00 PM and 11.00 PM to avoid traffic congestion. Gradually introduce bigger containers to replace rubbish depots, open depots and skip containers. Hydraulically operated equipment shall be used for transportation of waste under any circumstances shall not be handled manually. Increases performance of drivers and fillers by improved monitoring of attendance performance, working hours and trips made. Create a service minded working culture and re-establish a sense of responsibility. As a result optimal routing can be established causing fuel and time saving. Open trucks must be fixed with back doors which open sideways, to permit optimal loading and minimize chances for waste loss during transport, Refuse collector must be faced out due to poor and expensive performance. The Refuse collector can be sold. Vehicle lying in long term disrepair and other scrap material can be sold as well. Open trucks should in due time be replaced by container trucks in phase.

7.2.4 Disposal of Solid Waste -

The Solid waste collected from various sources should not be disposal off in open dumpsites without segregation or processing. There is no engineered landfill site for safe disposal of solid waste in Kanpur City. According to municipal solid waste rules 2000, bio degradable waste shall be processed and converted into compost or used for power generation, recyclables should be segregated and sold to recyclers, no hazardous waste be dumped along with municipal solid waste, construction waste is to be segregated and used for filling low lying areas, and only remaining waste should be dumped in to engineered landfill facility.
7.2.5 Waste to Compost

The compactable waste primarily comprises of organic material such as kitchen and yard waste, refuse from vegetable markets and food waste from hotels and restaurants; cow dung and during waste. It can either be stabilized before sending it to a landfill or can be converted into a valuable material such as compost bio-gas, filler material in landfills etc. However the landfill requirements for disposal of MSW and consequent further contamination of the environment can be avoided by processing of the biodegradable waste into usable material viz. compost.

The composting of biodegradable portion of municipal solid waste will be done by the proven window technology. The windows will be aerated to self propelled windrow once a day and will be turned and mixed using a front and loader once a week. The moisture content will be maintained by manual sprinkling on a daily basis. In addition a temporary cover will be provided on these windrow to prevent odour and flies so the composting is the process of decomposition and stabilization of organic matter under control conditions.

7.2.6 Identification of New Landfill Sites

The efficacy of solid waste disposal depends upon the selection of proper site. There are several issues that have an impact for site selection. Many technical (Volume capacity accessibility and hydrological condition) environmental (bedrock soil permeability etc) and socio economic factors (public acceptability) are involved in selecting a new sanitary landfill site. Site selection is a part of environmental planning where the principal objectives is to select landscape that is functional safe.

A locational criteria may be specified by a regulator agency eg. Pollution control Board. In the absence of regulation, requirements the following criteria are suggested. If it is absolutely essential to site a landfill site within the restrict zone, then permission from the regulatory agency must be sought. The important locational factors are cited below:
• No land fill should be constructed within 200 meters of any lake or pond. Because of concern regarding runoff of waste water contract, a surface water monitoring programme should be established.

• No landfill should be constructed within 100 m of navigable river or stream. The distance may be reduced in some instances for non-meandering rivers but a minimum of 30m should be maintained in all cases.

• No landfill should be constructed within a 100 year flood plain.
• No landfill should be constructed within 200m of the right of way of any state or national highway. The restriction is mainly for aesthetic reasons.
• No landfill site should be at least 500 m from a notified habitat area. A zone of 500 m around a landfill boundary should be declared No Development Buffer Zone after the landfill location is finalized.
• Landfill sites should not be constructed in a areas where the depth of underground water is less than 2 meters.
• No landfill site be developed within 20 km of an airport in the direction of approach and take off.
• A landfill should neither be constructed in coastal zone nor in unstable zone (fault zone, landslide prone Area etc.)
• No landfill should be constructed with in 500 m of any water supply well. It is strongly suggested that this locational restriction be abided by at least for down gradient wills.
• Area of former military activity where buried ordnance may be present and hence be avoided.
• Other criteria may be decided by the planners.
• The growth in municipal solid waste generation the world over as a consequence of urbanization, industrialization, and population growth, together with improved living standards has been widely reported. Municipal solid waste has also been recognized as one of the major problems confronting governments and city planners the world over.
The projected population (2021) of the city has been estimated to be about 4299572. Most recently the increase in population as well as the economic growth in the study area has transformed and urbanized the area and led to the change in land use and a substantial increase in municipal solid waste generated. Solid waste management system in the town is not effective as wastes are seen dumped on all manner of places including roads, near sensitive areas, and on private properties. It is therefore of importance that solid waste collected are properly disposed at designated sites in the city in order to avoid environmental degradation.

In locating proper sites (Landfills), consideration is giving to environmental factors mainly to avoid environmental risk. Again landfill site should be located far from residential areas and settlement.

The proposed landfill site will be outskirt of zonal bouandries is mentioned in figure no 7.2. The site should be away from areas that are susceptible to flooding, as this could result in washout of disposal waste into groundwater or stream and would pose risk to human health, the local aquifer and the environment. Other factors relating to land use, roads, slope, wind direction etc. are considered in locating a risk free and environmentally friendly waste disposal site.
7.2.7 Financial Management

Transfer and financial management of solid operations to a single solid waste department to introduce more business like financial management and increase financial accountability. This department should have its own accounting system. Based on approved annual budgets, funds should be transferred to the department periodically. Consequently, the solid waste department will have the responsibility over both expenditures and income. A long term financial management plan has to be part of the financial management. It is also recommended that the solid waste department will be allowed to collect and retains fees for services provided.

Identify mechanisms for bringing salaries of the municipal sweepers in line with national salary levels for municipal sweepers in line with national salary levels for municipal sweepers over a period of time. Re evaluate the salaries of other employees as well. It may not be feasible to reduce salaries below there current level. In that case it can be considered to opt for converting part of the salary into a performance based bonus. Ideally, the remuneration should consist of a basis salary plus potential performance related bonuses. In view of K.N.N. financial crises, this should be done without increasing the overall salary burden on the municipality allocation diesel based on actual trips made and actual consumption per kilometer.

The allocation of budget should be on the basis of population not in terms of area. Planners should identify the vulnerable zone in the study area. There should be formulation of plan on the basis of priority. An attempt should be made to examine the priority of the society and research should be focus on what is the immediate need of the society before the implementation of any plan in the study area.