Waste Disposal Challenges and its Impact on Human Health and Environment in Kanpur Metropolis

The modern culture of consumerism has aggravated the waste related problems due to which we are not availing pure air, safe water, narrowing of roads due to littered and scattered garbage and worsening aesthetics along with affecting public health. The collection, treatment and disposal facilities are insufficient which obviates the huge potential for creating jobs and incomes. Therefore, to manage exponentially increasing amount of garbage, cheap and more appropriate solutions are required and the role of individual is very important along with the administrative planning and execution system. Possibly detrimental effects could have been avoided if common man is made aware of affects formerly.

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All human activities inevitably produce waste and the modern culture of consumerism has aggravated the waste problem. Presently in urban areas, we are facing choking of sewer lines, foul odor, dust and particulate matter originated from garbage, blocking of drains, road encroachment and degraded environmental the challenges for the survival of human beings. Due to these waste disposal problems, we are not availing pure air for breathing, uncontaminated and safe water for drinking, freely moving on streets in rainy season and narrowing of roads due to littered and scattered garbage.

The major objectives of the paper are to identify the challenges due to improper waste disposal and its effect on human health and surrounding environment. The study area is Kanpur Metropolis. The proposed study is mainly based on primary data collected through classified random sampling. The impact is also assessed with the help of interviews from the doctors and patients of various localities. The collection, treatment and disposal facilities are highly inadequate and proper facilities are almost non-existent in majority of the study area. We have analyzed the data at the micro-level of per person per day quantity of waste generation and disposal in the city. Analysis reveals that the total 2508394 kg waste is generated daily in Kanpur city which comprise 46.01% kitchen waste and 53.99% solid waste. Therefore, to manage exponentially increasing amount of garbage, cheap and more appropriate solutions like segregation at source level, community composting, recycling etc are to be required.

Manage exponentially increasing amount of garbage, With the development of civilization and increasing per capita income, drastic changes came in our life style, therefore in every activity we are generating lot of waste. The modern culture of consumerism has aggravated the waste problem due to which presently in urban areas we are facing choking of sewer lines, foul odor, dust and particulate matter originated from garbage, blocking of drains, road encroachment and degraded environment are the challenges for the survival of human beings. Due to these waste disposal problems, we are not availing pure air for breathing, safe water for drinking, freely moving on streets in rainy season and narrowing of roads due to littered and scattered garbage. The collection, treatment and disposal facilities are highly inadequate and proper facilities are almost non-existent in majority of the study area. One recent

report did mention that only about 3% of municipal budget is earmarked for SWM in general whereas the figure in high income economies is about 10% and the recovery of reusable material from garbage is barely 25%. Therefore, to manage exponentially increasing amount of garbage, cheap and more appropriate solutions like segregation at source level, community composting, recycling etc are to be required. In these processes the role of individual is very important along with the administrative planning and execution system. It has been observed that more the population of a city, greater is the quantity of waste generated.

Objectives-

1. To identify the challenges due to improper waste disposal.

2. Its effect on human health and surrounding environment.

Study Area-

The study area is Kanpur Metropolis (26° 30' N and 80°20' E) with 261.50 km^2 of municipal area. The urban agglomeration is 2551337 as per 2001 census and literacy rate is 68.03%. The study area Kanpur Metropolis is administered by Kanpur Nagar Nigam and Kanpur Nagar is divided into six zones for the purpose of administration. There are 110 municipal wards in Kanpur Nagar Nigam. The 110 wards are locationally divided into 6 zones where zone 1 to zone 4 has 18 wards each but zone 5 and zone 6 has 19 wards each.

Methodology-

The study is mainly based on primary data collected through classified random sampling. The impact is also assessed with the help of interviews from the doctors and patients of various localities. Information related to social and demographical condition of the Kanpur city was collected from secondary sources such as Census of India, Kanpur Nagar Nigam, Kanpur development authority, Health department of the city. Collected data is analyzed according to the following formula:-

1- Ratio of Disposal Methods:

(i) Type of Disposal x Total Population
Total Waste

(ii) Obtained Persons ha Total Population x 100

2- People Involvement:

(i) Particular Waste x Total Population
Total Waste

(ii) Obtained Persons ha Total Population x 100

Analysis-

The Total waste generated in the city is studied under two main headings such as proper disposal and improper disposal which is further categorized into recyclable waste and Kitchen waste that is degradable

and is analyzed zone wise according to our objectives. Total waste generation, amount of proper disposal and improper disposal in six zones of the city is shown in Table No 1.

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Table No. 1
Total Waste Generated: Recyclable and Kitchen

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Zones	Total Population	Total Waste	Proper Disposal	%	Recyclable Waste	Kitchen Waste	Improper Disposal	%	Recyclable Waste	Kitchen Waste
1	415038	605540.40	502884.74	83	381552.74	121332	102655.69	17	24354.42	78301.27
2	431821	341570.40	218785.75	64	128466.75	90319	122784.66	36	22677.60	100114.06
3	425401	347552.60	237239.14	68	142037.14	95202	110313.47	32	22167.64	88145.83
4	390203	556819.70	446725.32	80	340364.32	106361	110044.35	20	27597.10	82497.25
5	438499	317513.00	230696.97	73	103801.97	126895	86815.99	27	16897.99	69918.00
6	436499	339398.20	212435.57	63	125511.57	86924	126962.65	37	18754.60	108208.05

In our study, we observed that in zone 1, total waste generated is 605540 kg in which 502884 (83%) kg is properly disposed that contains 381552 kg is recyclable waste (58%) and 121332 kg (42%) is Kitchen waste whereas 102655 (17%) kg is improperly disposed that constitutes 24354 kg is recyclable waste (75%)and 78301 kg is kitchen waste (25%). The waste generation and proper waste disposal is observed as highest in zone 1 while lowest in zone 5 but the quantity of properly disposed waste is lowest in zone 6. In case of improper waste disposal in zone 2, maximum improper waste disposal is observed where it is 27%.

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Table No. 2
People Involvement and Quantity of Waste

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zone	Proper Disposal				Improper Disposal			
	Recyclable Waste		Kitchen Waste		Recyclable Waste		Kitchen Waste	
	Quantity	People Part %	Quantity	People Part %	Quantity	People Part %	Quantity	People Part %
1	381552.74	75	121332	24	24354.42	25	78301.27	76
2	128466.75	58	90319	18	22677.60	42	100114.06	82
3	142037.14	59	95202	20	22167.64	41	88145.83	80
4	340364.32	76	106361	25	27597.10	24	82497.25	75
5	103801.97	51	126895	20	16897.99	49	69918.00	80
6	125511.57	59	86924	14	18754.60	41	108208.05	86

The people involved in proper and improper disposal is shown in Table No 2 in percentage. We have observed that recyclable waste is disposed more properly than Kitchen waste in all the six zones. In zone 1 and zone 4, due to better civic facilities and alertness of people, more people do proper disposal while few people are doing improper disposal where the ratio of people participation of recyclable waste is 75 % and 25 % while 24 and 76 of kitchen waste in zone 1 and 76% and 24% with 25 and 75

respectively in zone 4 but in zone 5 comparatively less people (51%) are involved in proper disposal while more people (49%) are doing improper disposal which is lowest of all the zones of the city. We have also observed that people are more interested to dispose recyclable waste properly than kitchen due to monetary benefits. Collection and storage is also possible in case of recyclable wastes whereas kitchen waste degrade in short time so it has to be discarded whether properly or improperly.

Table No.3
Composition of Waste and their Share in percent

Types of waste	Share of Total Waste
A-Gradable Waste	
1- GardenhAhorticulture hadairy waste	30.00%
2- Food waste	16.00%
3- PaperhaCard board	04.00%
B- Non-Gradable Waste	
4- Drain silt	19.25%
5- Construction waste	16.00%
6- Plastic	14.00%
7- Glass	0.50%
8- Metal	0.25%
Total	100%

Composition of waste and their share in percent is analyzed by various agencies like NEERI, CPCB, Municipal corporations of the cities and waste management companies like A2Z Infrastructure. The analysis of the authors closely matches with the analysis done by Kanpur Nagar Nigam (shown in Table No. 6) where organic waste is found highest and lacks recyclables in daily disposals for the reason of selling it to vendors.

Table No. 4
Waste Types and its Impact level on Elements of Environment

Type of Waste	Impact Level on Elements of Environment			
A. Degradable	Air	Water	Soil	Others(choking of drains,Roads)
Peels	High	High	High	High
Residual Waste	High	High	High	High
Food waste	High	High	High	High
Paper	High	High	High	High
Linen	High	High	High	High
B. Non - Degradable			Impact Level on Elements of Environment	
Plastic	High	Negligible	Negligible	M
Metal	High	Negligible	Negligible	M
Glass	High	Negligible	Negligible	M
Rubber	High	Negligible	Negligible	M
Packing Materials	High	High	High	High
Others	High	High	High	High

Impact level on elements of environment depends on the waste disposal methods and in our studies we have observed unscientific and improper disposal of waste in urban areas. Waste is broadly categorized into degradable and non-degradable. The impact of waste on elements of environment varies in terms of time, type and level. We have classified the effects under high, medium, low and negligible categories as shown in Table No. 4. Degradable waste such as kitchen waste, have short term effect but produce odor, release greenhouse gases while decomposition and is a breeding ground for microbes and pathogens leave behind fossil effects on air, water and soil while non-degradable such as plastic, metal, glass etc if thrown encroaches land, chokes drains but do not change composition of elements of environment. When recyclable waste is recycled, it leaves behind severe effects in air by releasing greenhouse gases. Recycling or 'Urban Mining' is a common phenomenon i.e. all metals disposed is collected and sent for recycling.

Table No. 5
Pollutants absorbed in Environmental Elements and its Effect on Health

Environmental Elements	Pollutants absorbed	Diseases
Air	NO2, CO2, CO, Ethene, Methane, Furon, Dioxin, Ammonia, Hydrogen Sulphide, Particulate matter, Hydrocarbon, Amine, Alchohol, Aldehyde, Phenol, Mercaptans, Easters, Chlorine, Chlorinated Organic Compounds,	Irritation, Loss of appetite, Giddiness, Nausea, Anorexia Respiratory disorders, Emphysema, Lung Infections, Oxygen carrying capacity of blood reduced, Nausea, Headache, Unconciousness, Cardiac problems, Cough, Cold, Bronchitis, Lung infection, Tuberculosis, Eye infections, Skin problems.
Water	Nitrate, Ammonia, Putrescible material, Phosphates, Sodium, Calcium, Ammonium compounds, Alkyle benzene sulphonate.	Jaundice, Typhoid, Dysentry, Diarrhoea, Cholera, Colon cancer Dengue fever, Yellow fever, Japanese encephalitis, Chickenguinea, Strange fever,
Soil	Soil Pathogenic organisms and a chain of soil pollution harmful chemicals from synthetic materials, batteries, insect repellent, insecticides, soaps and detergents, excreta	nausea, headache, unconciousness, cardiac problems, Plague, Worm Infestations,

Pollutants absorbed in environmental elements and its effect on health is shown in Table No. 5. Diseases in India are mainly contagious and caused due to contamination of air, water or soil. Our studies show that accumulation of waste directly affecting all the elements of environment. According to a report issued by Medical College, 550 cases of dengue, 485 cases of malaria, numerous cases of viral

infections and gastrointestinal problems are reported in 4 months after the monsoons in the year 2013. As shown in Table No 5 NO_2, CO_2, CO, Ethene, Methane, Furon, Dioxin, Ammonia, Hydrogen Sulphide, Particulate matter, Hydrocarbon, Amine, Alchohol, Aldehyde, Phenol, Mercaptans, Easters, Chlorine, Chlorinated Organic Compounds are the pollutants of the air released from different sources. Nitrate, Ammonia, Putrescible material, Phosphates, Sodium, Calcium, Ammonium compounds, Alkyle benzene sulphonate are the pollutants of the water released from different sources. Pathogenic organisms and a chain of Soil pollution harmful chemicals from synthetic materials, Batteries, insect repellent, insecticides, Soaps and detergents, excreta are the pollutants of the soil. released from different sources. Irritation, Loss of appetite, Giddiness, Nausea, Anorexia, Respiratory disorders, Emphysema, Lung Infections, Reduced Oxygen carrying capacity of blood, Nausea, Headache, Unconciousness, Cardiac problems, Cough, Cold, Bronchitis, Lung infection, Tuberculosis, Eye infections, Skin problems are caused commonly due to pollutants of air. Jaundice, Typhoid, Dysentry, Diarrhoea, Cholera, Colon cancer Dengue fever, Yellow fever, Japanese encephalitis, Chickenguinea, Strange fever are caused commonly due to pollutants of water and Nausea, Headache, Unconciousness, Cardiac problems, Plague, Worm Infestations caused commonly due to pollutants of soil.

Conclusion:-

The neglect of solid waste management (SWM) is growing into a huge stink, which gravely compromises public health and environment and obviates the huge potential for creating jobs and incomes that exists inf collecting waste and its systematic recycling. The fact of the matter is that about 90% of urban solid waste is disposed of unscientifically in open dumps and landfills which are both, hazardous and unsustainable. The way ahead is rev up efficiency in refuse collection and disposal with up to date systems and practices. There are instances of proactively for SWM such as the setting up of co operatives for garbage collection but conspicuously lacking is holistic policy design to cope with the sheer volumes of refuse likely with rising income and urbanization. We need rigorous norms and standards for all Indian cities and urban centers and a game plan to implement the policy with concrete follow through action. In parallel we need close scrutiny and regular review of SWM outcomes nationwide. The bottom line is that we need to refurbish municipal finances and
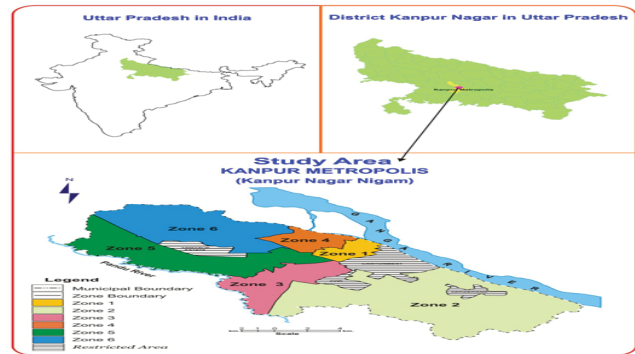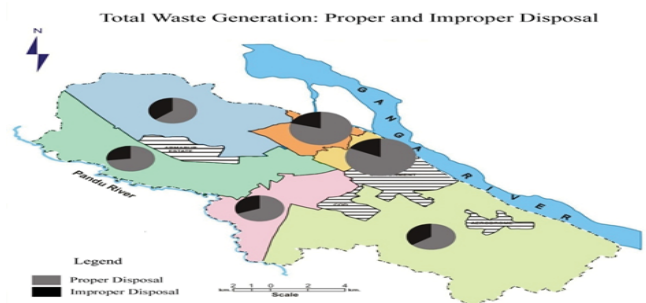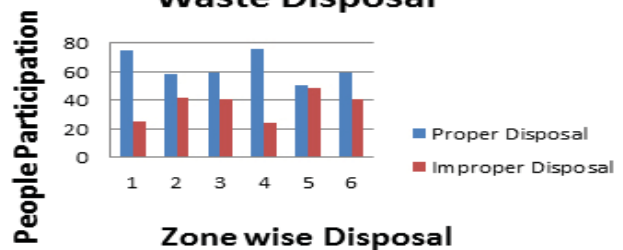
Fig. 1

Total Waste Generation: Proper and Improper Disposal
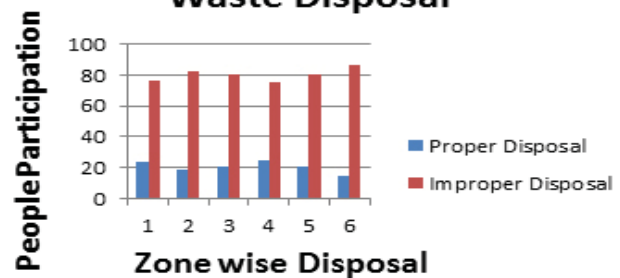
Fig No.2

Fig No.3

आन्दोलन किया तथा फसल काटा। राहुल सांकृत्यायन का पहला जत्था ऊख काटने खेत में पहुँचा। जमींदार परिवार ने लठैतों को उकसाया मदार पीतवस्त्रधारी बौद्ध-भिक्षुओं पर हाथ उठाने की उनकी हिम्मत नहीं हुई। अन्त में पीलवान कुरबान ने उनके सर पर लाठी से प्रहार कर दिया और उनके सर से खून गिरने लगा। राहुल सहित दो दर्जन किसानों को पुलिस ने गिरफ्तार कर सीवान जेल में भेज दिया। जमींदार के कहने पर पुलिस ने कुरबान को छोड़ दिया।[12]

> ''राहुल के सर खुन गिरे,
> फिर वह खुन उबल ने उठे।
>
> साधु के शोणित से फिर क्यों,
> सोने की लंका जल न उठे।''

जमींदारी प्रथा को पूरी तरह से खत्म करके कांग्रेस ने कृषि ढाँचे के कायाकल्प की कोशिश नहीं की थी विभिन्न वर्गों के बीच ताल-मेल बैठाना आवश्यक था। जमींदार वर्ग अंगेजों का पक्षधर न हो जाए, इसका भय था। राष्ट्रीय संगठन के रूप में कांग्रेस भी वर्गों का मंच था, सभी वर्ग कांग्रेस के अंग थे। विधान परिषद् में प्रतिक्रियावादी तथ्यों का बोलबाला था। साथ ही प्रशासनिक ढाँचा बदलने का काम गर्वनर के अधिकार क्षेत्र में था। किसान आन्दोलन और राष्ट्रीय आन्दोलन में अटूट रिश्ता था।

बिहार में कांग्रेस और किसान सभा के नेतृत्व में गम्भीर मतभेद पैदा हो गया और कभी-कभी तो किसान आन्दोलन और कांगेस सरकार मुठभेड़ के रास्ते पर चले गए। लेकिन ऐसा वहीं, हुआ, जहाँ वाम पंथी कार्यकत्ताओं और कांग्रेस के दक्षिणपंथी समर्थक अपनी-अपनी जिद पर अड़ गए और एक दूसरे के साथ चलने के लिए तैयार नहीं हुए।[14]

सन्दर्भ:-

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governance for sound handling of urban refuse, intense education and awareness for common mass. It is apathy towards nature and oneself as we do not know the consequences of decomposition of waste on health and environment. Possibly detrimental effects could have been avoided if common man is made aware of affects formerly.

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