URBAN GROWTH AND WASTE GENERATION

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ABSTRACT

Urbanization is the process by which more and more people leave the countryside to live in cities. There is a tendency for people to move towards urban areas in search of better opportunities and better living standards. Apart from this rural and semi rural areas also slowly develop with better infrastructure, better education facilities, health care, transportation network, banking, housing, governance etc. and these areas turn into urban areas very soon. As urbanization becomes the goal of every country the issues which arise due to it also needs to be addressed. Some of the issues of urbanization are high density of population which leads to housing problems, high energy consumption, a stress on basic facilities like water, sanitation and environmental problems like pollution, inadequate waste management etc. And among these one of the major and the most urgent one is managing our waste because its implications are environmental, social, economic and political. Since the major impact is on the environment and human health it requires immediate attention. The problem with waste generation is the sheer volume of waste generated in urban areas and the inability of the civic authorities to handle themPopulation growth contributes to a large extent to increasing municipal solid waste in India.This huge population generates a lot of waste the reason for this escalating trend is a mix of the changing lifestyles, food habits and changes in standard of living. The collection of municipal solid waste is inefficient, its transport is inadequate, and its disposal is unscientific.

KEY WORDS

Urbanisation, issues of urbanization, waste generation problem, population growth, changing lifestyle, unscientific disposal, need for PPP.

INTRODUCTION

Urbanization is the process by which more and more people leave the countryside to live in cities. It can also be termed as the progressive increase of the number of people living in towns and cities,[1]Urbanization is increase in the proportion of population living in urban areas; it is a process by which large number of people become permanently concentrated in relatively small areas, forming cities.[1]

There is a tendency for people to move towards urban areas in search of better opportunities and better living standards. The reason being that people perceive life in urban areas to be of a higher standard than that of rural areas. Todaro attributes the phemonena of massive unemployment in less developed counties to an excess inflow of workers in rural areas to urban areas which is induced by rural urban income differences in these countries.[2]As people move in search of greener pastures, the immediate outcome is urbanization. This is very common in developing countries as there is a tendency for people to take advantage of the facilities available in urban areas.

[1] http://dictionary.cambridge.org/dictionary/english/urbanization

About 34% of India's population now lives in urban areas[2]. This is an increase of about 3% points since the 2011 census. One way to look at the growth in urbanization is by studying the size of urban agglomeration which denotes contiguous territories with an urban population density. The number of megasized urban clusters (above 50 lakh population) has remained almost constant over the years. However the number of smaller urban clusters has also been increasing rapidly.[3].

The foremost reason for urbanization in most of the countries is industrialization. With the advent of industrial revolution this has been the trend that could be witnessed. The advantage of improved employment opportunities coupled with higher incomes has been a major factor contributing to this. In India with agriculture being a gamble of the monsoons this led people to take up more industrial activities. Since agriculture is a seasonal operation, it is somewhat misleading to speak in terms of a homogeneous unit of labor. A unit of labor at the time of harvesting is not replaceable by a unit of labor at a slack period. Indeed it has been found in many peasant economies that at the harvesting time many peasant families themselves hire outside labor. Around this busy season the labor market becomes much more perfect, and we could even assume that the wage gap disappears at this time of the year[3]

The role of trade and commerce also is also very important. Due to this people could participate in exchange of goods on a large scale. The Ministry of Commerce & Industry is creating an action-oriented plan which will highlight specific sector level interventions to bolster India's march towards becoming a USD 5 trillion economy before 2025. The focused plans will be on boosting services sector contribution to USD 3 trillion, manufacturing to USD 1 trillion and Agriculture to USD 1 trillion.This initiative will enhance the competitiveness of India's service sectors through the implementation of focused and monitored Action Plans, thereby promoting GDP growth, creating more jobs and promoting exports to global markets.[4]

The availability of better educational facilities, better living standards, health care facilities, recreation and social life in general have attracted more people to urban areas. This opens up employment opportunities for people in urban areas which includes both skilled and unskilled labour. Both are therefore able to get employment and lead better lives. It also gives them an assurance that future generations have ample scope for development.

In India modernization set in especially after Globalization, Liberalization and Privatization. Modern lifestyle which is more tech savvy brings in a lot of convenience. This attracts a lot of people to urban areas and this leads to a modern culture and societal set up.

The trends in urban growth can be witnessed from the table below and this indicates an upward trend.

Trends in India's urbanization: 1961-2011

Census year	Urban population in mill	Percentage urban	Annual exponential growth rate(%)
1961	78.94	17.97	-
1971	209.11	19.91	3.23
1981	159.46	23.34	3.79
1991	217.18	25.72	3.09
2001	286.12	27.86	2.79
2011	377.10	31.16	2.76

Bhagat, R. B. 2011. Emerging pattern of urbanisation in India. Economic and Political Weekly 46, 10-12.)

[2] UN World Urbanisation Prospects 2018 Report
[3]Urbanisation on the rise-The Hindu e paper dated May 18,2018.

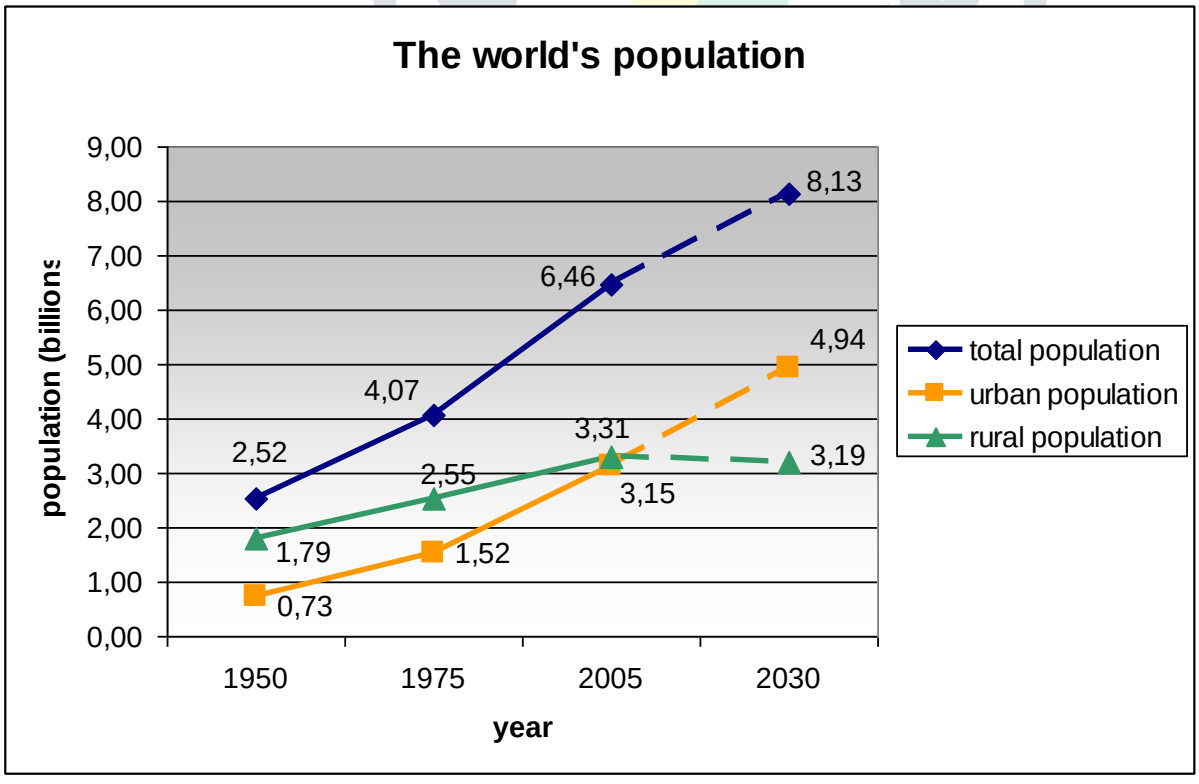
Note: As the 1981 Census was not conducted in Assam, and the 1991 Census was not held in Jammu and Kashmir, the population of India includes projected figures for these states in those periods

(An overview of India's Urbanization, Urban Economic Growth and Urban Equity Sabyasachi Tripathi Institute for Social and Economic Change March 2013)Online at https://mpra.ub.uni-muenchen.de/45537/ MPRA Paper No. 45537, posted 26 March 2013 10:42 UTC

Apart from this rural and semi rural areas also slowly develop with better infrastructure ,better education facilities, health care, transportation network, banking, housing, governance etc and these areas turn into urban areas very soon.

As the world becomes a global village the aspiration to dwell in urban areas grows.Alook at the projections for urbanization would throw light on this.According to the UN department of Economic and Social Affairs publications(2018) 55% of the world's population lives in urban areas a proportion that is expected to increase to 68% by 2050.Projections show that urbanization could add another 2.5 billion people to urban areas by 2050 with close to 90% of this increase taking place in Asia and Africa. The 2018(UNDESA) report notes that future increases in the size of the worlds urban population are expected to be highly concentrated in just a few countries. Together India, China and Nigeria will account for 35% of the projected growth of the worlds urban population between 2018 and 2050.By 2050 it is projected that India would have added another 416 million urban dwellers.[4]

By 2030 the world is projected to have 43 megacities with more than 10 million inhabitants, most of them in developing regions. Megacities are usually defined as metropolitan areas with a total population of 10 million or more people.



[4] https://www.un.org/development/desa/publications/2018-revision-of-world-urbanisation-prospects.html

Source:Total, urban and rural populations 1950-2030 (Data from UN Department of Economic and Social Affairs/Population Division. World Urbanization Prospects: The 2005 Revision).

Understanding the key trends in urbanization is therefore important to implement sustainable development. This is especially true for low and middle income countries which are vulnerable to the problems of urbanization.

The graph below shows the trends in India's urban population. It shows an upward trend in urban growth and a downward trend in rural areas.

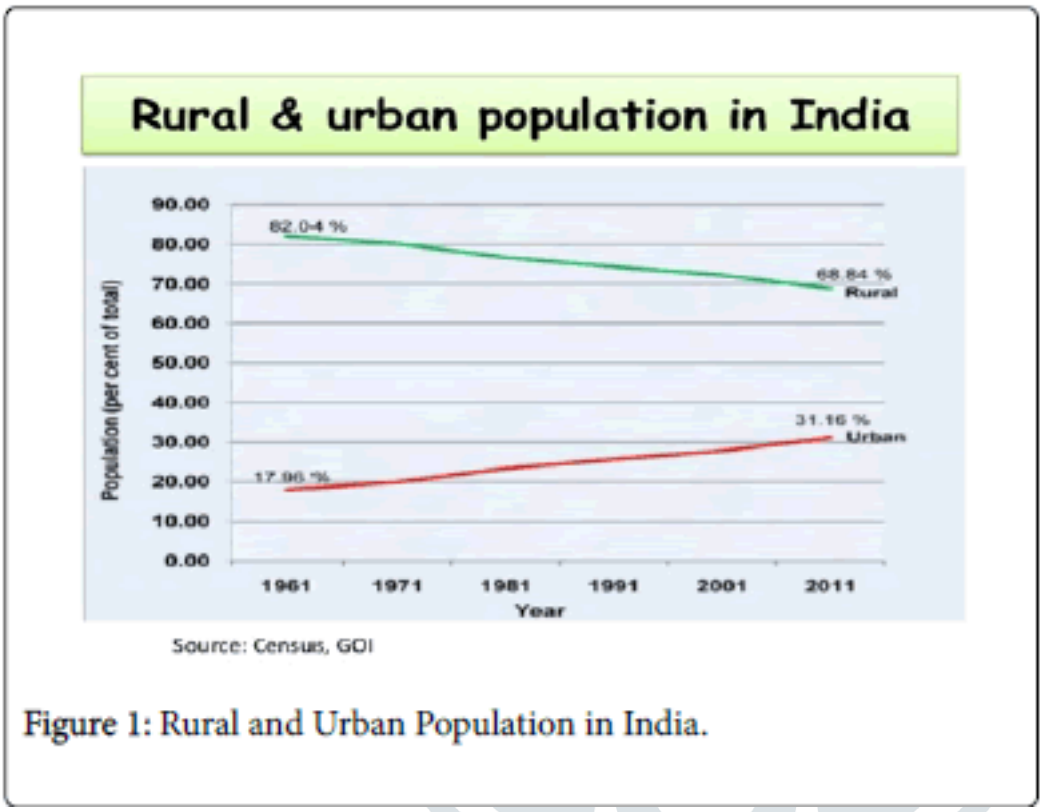


Figure 1: Rural and Urban Population in India.

Source: https://www.omicsonline.org/open-access/recycling-of-used-paper-packaging-for-rural-development-2475-7675-1000153-103614.html

It can be seen that the rural population declined from 72.19% in 2001 to 68.84% in 2011and the level of urbanization increased from 27.81% to 31.16% in this period.Every year, millions leave their traditional homes in rural towns and villages and head into urban areas. The United Nations World Cities Report 2016 says 9.6 million people will move to New Delhi by 2030. The UN takes into account urban sprawl and measures populations beyond official city limits. On these criteria, India currently has five megacities.[5]

Namely New Delhi with a population of 26.5 million people, Mumbai has a population of 21.4 million people , Kolkata with 15 million people living in urban area , Bengaluru The 'Silicon Valley' of India with 10.5 million people and Chennai with 10.2 million people.

There are other urban areas in Indiawhich are growing rapidly as people look to cities for jobs and financial security, as well as the chance of a better education for their children. This rural-to-urban migration will result in two more urban areas becoming megacities by 2030, says the UN which are Hyderabad and Ahmedabad.

The UN's World Cities report finds that big cities "create wealth, generate employment and drive human progress". On the downside, megacities are also responsible for driving climate change, inequality and exclusion, as well as the breakdown of traditional family structures, which leaves elderly people isolated and vulnerable.[5]

As urbanization becomes the goal of every country the issues which arise due to it also needs to be addressed.Some of the issues of urbanization are high density of population which leads to housing problems, high energy consumption,a stress on basic facilities like water ,sanitation and environmental problems like pollution ,inadequate waste management etc.And among these one of the major and the most urgent one is managing our waste because its implications are environmental,social,economic and political.Since the major impact is on the environment and human health it requires immediate attention. The problem with waste generation is the sheer volume of waste generated in urban areasand the inability of the civic authorities to handle them. According to Down To Earth, "Over 377 million urban people live in 7,935 towns and cities and generate 62 million tons of municipal solid waste per annum. Only 43 million tons (MT) of the waste is collected, 11.9 MT is treated and 31 MT is dumped in landfill sites."

Population growth contributes to a large extent to increasing municipal solid waste in India.

Population growth in India between 1911 and 2011.

census year	**population $\times 10^6$**	**decadal growth $\times 10^6$**	**average annual exponential growth rate (%)**	**progressive growth rate compared with 1911 (%)**
1911	252.0	13.7	0.56	5.75
1921	251.3	−0.8	−0.03	5.42
1931	278.9	27.6	1.04	17.02
1941	318.6	39.7	1.33	33.67
1951	361.1	42.4	1.25	51.47
1961	439.2	78.1	1.96	84.25

[5] https://www.weforum.org/agenda/2019/05/24-iconic-world-flags-and-what-they-mean/

1971	548.1	108.9	2.20	129.94
1981	683.3	135.1	2.22	186.64
1991	846.4	163.1	2.16	255.05
2001	1028.7	182.3	1.97	331.52
2011	1210.2	181.4	1.64	407.64

Source: Provisional Population Totals-India, 2011.

The table above shows the growth in population which has been constantly increasing.Rapid population growth has overwhelmed the capacities of municipal authorities to provide even basic services.Urbanization directly contributes to waste generation and unscientific waste handling causes health hazards to municipal workers involved in this and basically leads to urban environmental degradation.

According to census 2011, India had a population density of 325 per sq km where India's 2.9 million sq land area holds close to 18% of world's population.Urban India is categorized into six tiers based on population .There are 3 megacities holding a population of 10 million or more,53 urbanagglomerations with a population of one million or above and 468 towns with a population of 100000 and above.[6]

This huge population generates a lot of waste. According to Press Information Bureau India generates 62 million tonnes of waste every year with an average annual growth rate of 4%.[7](PIB 2016)

Therefore with increase in population growth the immediate and obvious outcome would be the increase in waste generation.Due to this increase in waste generation and the improper disposal of waste in the country the ministry of Environment and Forest (MoEF)has developed the municipal solid waste (Management and Handling)Rules 2000.These rules have specified many compliance for the management of solid waste for the State Committee and Pollution board.The project undertaken by them for Chennai city reports that the solid waste gathered from Chennai is 3000 tons/day .Chennai has been reported with lesser organic matter which might be due to high temperature.[8]According to the report of the Central Pollution Control Board ,Ministry of Environment ,Forest and Climate Change,Government of Indiaon the trends of solid waste generation in 46 cities there is an upward trend.The table below highlights The four metros and their waste generation.It can be seen that the growth in waste generation is manifold over the past few years.

[6] Census Department,Govt of India(2011)-Official Census reports.http://census India.gov.in/2011-common/census-2011.html
[7]http://www.epw.in/engage/article/institutional-framework-implementing-solid-waste-management-India-macroanalysis
[8]Govt of India-Ministry of Statistics and ProgrammeImplementation,nospi.nic.in/research-studies-comparative

Rank	City	population	Waste generation(TPD)			
			1999-2000	2004-05	2010-11	2015-16
1	Mumbai	12,442,373	5355	5320	6500	11000
2	Delhi	11,034,555	4000	5922	6800	8700
3	Chennai	7,088,000	3124	3036	4500	5000
4	Kolkatta	4.496.694	3692	2653	3670	4000

Source:cpcb.in/waste.generation-composition/

The problem is that The growth in MSW (municipal solid waste) generation in India has outpaced the growth in population in the recent years. The daily per capita generation of municipal solid waste in India ranges from about 100 g in small towns to 500 g in large towns. The recyclable content of waste ranges from 13% to 20% (CPCB 1994/95). The survey conducted by CPCB puts total municipal waste generation from Class I and II cities to around 18 million tonnes in 1997 (CPCB 2000b). The reason for this escalating trend is a mix of the changing lifestyles, food habits and changes in standard of living. Another table depicts the kg per capita per day in major cities in India.This gives us an idea of the daily generation

Major cities in India and per capita waste generation data (2010–2011)

city	***population (2011) × 10^6**	**#total waste generated in tonnes per day**	**waste generation (kg *per capita* per day)**
Ahmedabad	6.3	2300	0.36
Hyderabad	7.7	4200	0.54
Bangalore	8.4	3700	0.44
Chennai	8.6	4500	0.52
Kolkata	14.1	3670	0.26
Delhi	16.3	5800	0.41

Mumbai	18.4	6500	0.35

Source: *Census of India 2011, #CPCB Report 2011.

Waste generation per capita in Indian cities.

population	**waste generation rate (kg *per capita* per day)**
cities with a population <0.1 million (eight cities)	0.17–0.54
cities with a population of 0.1–0.5 million (11 cities)	0.22–0.59
Cities with a population 1–2 million (16 cities)	0.19–0.53
Cities with a population >2 million (13 cities)	0.22–0.62

Source:Source: Kumar *et al*.Kumar S, Bhattacharyya JK, Vaidya AN, Chakrabarti T, Devotta S, Akolkar AB. 2009. Assessment of the status of municipal solid waste management in metro cities, state capitals, class I cities, and class II towns in India: an insight. Waste Manage. 29, 883–895. (doi:10.1016/j.wasman.2008.04.011) [PubMed] [Google Scholar]

Kumar KN, Goel S. 2009. Characterization of municipal solid waste (MSW) and a proposed management plan for Kharagpur, West Bengal, India. Resour. Conserv.Recycling 53, 166–174. (doi:10.1016/j.resconrec.2008.11.004) [Google Scholar]

The table above shows the range of waste generation in cities with different populations.This table also shows that apart from the mega cities and other major cities there is an upsurge of many smaller cities which need to be noticed.Our focus on waste generation should not be only on the major metros but on all urban sprawls since before we could realize the problem would become insurmountable.Already the civic authorities are finding it difficult to cater to the needs of the cities ,therefore with the transition of rural areas into urban areas it would become an herculean task.

The TERI 'Green India 2047' study made the following observations on the situation of municipal solid waste management in the country (TERI 1998): They have stated that the major reasons for increased solid waste generation in Indian cities is increasing urbanisation and changing lifestyles which has led to solid waste generation to increase from 6 million tonnes in 1947 to 47.8million tonnes in 1997.They have also stated that the production and consumption of plastic increased over 70 times between 1960 and 1995 and the collection of municipal solid waste is inefficient (more than 25% of the total is not collected at all), its transport is inadequate, and its disposal is unscientific.

Not all the waste disposed is collected,more than one-fourth of the municipal solid waste is not collected at all. The collected waste is however dumped in landfills which are neither well equipped nor managed efficiently .The characteristics of MSW collected from any area depends on a number of factors such as food habits, cultural traditions of inhabitants, lifestyles, climate, etc.Therefore scientific study of waste characteristics and their appropriate disposal is required. Disposal of waste is a major issue of concern in India. Respective municipalities collect MSW in cities and transport it to the designated disposal sites, which is normally a low-lying area on the outskirts of a city. The choice of a disposal site is more a matter of what availability than what is suitable. Only a few cities follow good practices such as organized dumping of wastes, using mechanized equipment for leveling and compacting the wastes, and covering the top layer with earth before compacting it further. Of late, some cities have also started to practice composting the organic fraction of waste.

Management of biomedical waste is another issue of concern for municipalities. This waste produced in hospitals generally has high contamination of pathogens, making it hazardous. It also includes scalpels, needles, bandages, and other wastes from operating theatres and laboratories as well as infectious items, e.g. amputated body-parts, body fluids, cultures of contagious viruses, excreta from patients with highly contagious diseases, etc. Though waste from hospitals and nursing homes are required to be collected and treated separately, in most cities and towns such waste continue to form a part of the MSW in absence of any dedicated disposal facilities for hospital waste. The MoEF, Government of India has issued the Municipal Solid Wastes (management and handling) Rules in the year 2000, which identify the CPCB (Central Pollution Control Board) as the agency to monitor the implementation of these rules. For the management of bio-medical waste, the MoEF has notified Bio-Medical Waste (management and handling) Rules in 1998 under sections 6, 8 and 25 of the Environment (Protection) Act of 1986.

Projections for solid waste

Waste generation trends- The per capita quantity of waste generation tends to increase with time due to factors as increased commercial activities and higher standard of living. In India, the amount of waste generated per capita is estimated to increase at a rate of 1%–1.33% annually[6](Shekdar 1999). The projected quantities of municipal solid waste for 2025 have been estimated and the scenario under the base case appears that the total waste generation in 2025 will exceed 140 million tonnes—three times the present level.[9]

[9]planningcommission.nic.in/reports/sereport/ser/vision2025/env2025.doc

Predicted population growth and overall impact on waste generation.

year	population ($\times 10^6$)	*per capita* generation (kg per day)	total waste generation (x 10^3 Tonnes per year)
2001	197.3	0.439	31.63
2011	260.1	0.498	47.30
2021	342.8	0.569	71.15
2031	451.8	0.649	107.01
2036	518.6	0.693	131.24
2041	595.4	0.741	160.96

Source: Annepu RK. 2012. Report on sustainable solid waste management in India. Waste-to-Energy Research and Technology Council (WTERT) 1-189. See http://swmindia.blogspot.in/ (accessed 26 June 2015).

The table above shows that urban India generated 31.6 million tonnes of waste in 2001 and is currently generating 47.3 million tonnes. By 2041, waste generation is predicted to be 161 million tonnes, a fivefold increase in four decades

The specific resources in any place hold the key to its sustainable development. Unplanned urbanization can cause a lot of problems .The trends in urbanization in India only report the quantitative increases and the requirements that we could have in the future.One of which would be to scientifically manage our waste.Any study on this indicates their upward trend in waste generation and the problems civic bodies in every city and town would face.This is a matter of concern for all developing countries.Therefore scientific methods of study on the volume of waste generated,nature of waste disposed and collected, habits and practices of people,process and methods adopted by civic bodies in their operation and financial viability in operations of waste management, logistics involved, the volume of manpower required and use of technology has to be studied in relation to urban growth in order to find solutions tohandle this looming problem of managing waste in increasing urbanization.Population growth is going to face an upward trend and so would be the growth of urban centres.Public participation is going to be fundamental to resolve this issue. The role of private players needs to be identified and especially the role of non –government organizations. It is not just the question of the government or the civic bodies addressing this issue because the magnitude of population

is an issue in India.World waste production is expected to be approximately 27 billion tonnes per year by 2050, one-third of which will come from Asia, with major contributions from China and India. Waste generation in urban areas of India will be 0.7 kg per person per day in 2025, approximately four to six times higher than in 1999 therefore there is an urgent need to address this issue, and build sustainable ways of handling,disposing and processing waste.There is therefore a need to identify public private partnership so that collective efforts could resolve it.

REFERENCES

1. Glossary of Environment Statistics, Studies in Methods, Series F, No. 67, United Nations, New York, 1997.

2. Harris, John R. &Todaro, Michael P. (1970), "Migration, Unemployment and Development: A Two-Sector Analysis", American Economic Review, 60 (1): 126–142, JSTOR 1807860

3. Peasants and Dualism with or without Surplus Labor Author(s): Amartya K. Sen Source: Journal of Political Economy, Vol. 74, No. 5 (Oct., 1966), pp. 425-450 Published by: The University of Chicago Press Stable URL: https://www.jstor.org/stable/1829592 Accessed: 28-08-2018 19:01 UTC

4. Press Information Bureau
Government of India
Ministry of Commerce & Industry
11-December-2018 18:01 IST

Year end review 2018-Ministry of commerce and Industry

5. https://www.weforum.org/agenda/2016/10/india-megacities-by-2030-united-nations/

6. Shekdar, A.V., 1999. Municipal solid waste management – the Indian perspective. Journal of Indian Association for Environmental Management 26 (2), 100–108.

7. https://www.national geographic.com/environment/habitats/urban-threats/