



A STUDY ON WASTE MANAGEMENT AND SOCIO-ECONOMIC STATUS OF SANITARY WORKERS IN INDORE

Submitted by

KRISHNAPRIYA BINDHU

Registration number: P210313

Under the Supervision of

Dr . P. BALAMURUGAM

Assistant Professor

Department of Economics

Central University of Tamil Nadu, Thiruvavur

CHAPTER -1

INTRODUCTION

Waste management in India is a significant issue, with the country generating approximately 62 million tonnes of municipal solid waste annually. The lack of adequate infrastructure, poor implementation of waste management policies, and a general lack of awareness about the importance of waste reduction and proper disposal are some of the main challenges facing the country.

The most common method of waste disposal in India is dumping, which has led to the creation of huge landfills that are now reaching their capacity. These landfills are often located near residential areas, causing health and environmental hazards for the communities living nearby.

In recent years, the Indian government has taken steps to address the issue of waste management. The Swachh Bharat Abhiyan (Clean India Mission) was launched in 2014 to promote cleanliness and sanitation across the country. The mission aims to achieve 100% sanitation coverage, eliminate open defecation, and promote effective waste management practices.

The government has also introduced several policies and regulations, such as the Solid Waste Management Rules (2016), which focus on waste segregation at the source, and the Extended Producer Responsibility (EPR) policy, which holds manufacturers responsible for the proper disposal of their products and packaging.

However, despite these initiatives, the implementation of waste management policies remains a challenge. The lack of proper infrastructure, inadequate funding, and a lack of awareness among the general public are some of the main obstacles.

Now, on the other side; the waste management is carried out in the country basically with help of sanitary workers, who's population is largely homogeneous in nature throughout the country. The Sanitary workers in India are a vital yet often overlooked group of workers who play a crucial role in maintaining public health and cleanliness. They are responsible for a range of tasks, including cleaning public spaces, collecting and disposing of waste, and maintaining sewer systems.

However, sanitary workers in India often face significant challenges and discrimination. Many of them come from marginalized communities such as Dalits (formerly known as "untouchables"), who are often relegated to the lowest rungs of the caste system. As a result, they are subject to social stigma and discrimination, which can manifest in a variety of ways.

One of the most pressing issues facing sanitary workers in India is their lack of access to basic safety equipment, such as gloves, masks, and boots. This leaves them vulnerable to a range of health hazards, including exposure to toxic chemicals, infectious diseases, and physical injuries. In addition, many sanitary workers are forced to work long hours for low wages, often without any social security benefits or job security.

Despite these challenges, there have been some positive developments in recent years. The Indian government has launched several initiatives aimed at improving the working conditions of sanitary workers, including the Swachh Bharat Abhiyan (Clean India Mission) and the National Safai Karamcharis Finance and Development Corporation (NSKFDC), which provides loans, grants, and training programs to sanitation workers.

There have also been efforts to raise awareness about the challenges faced by sanitary workers in India, and to advocate for their rights and welfare. Non-governmental organizations (NGOs) and civil society groups have been working to promote the rights of sanitation workers and to empower them to demand better working conditions and protections.

Indore is a city in central India that has been making significant strides in waste management in recent years. The city has implemented a number of innovative programs and initiatives aimed at reducing waste, improving recycling and composting, and promoting sustainable practices.

One of the most notable initiatives in Indore's waste management efforts is the Swachh Bharat Abhiyan (Clean India Mission), a national campaign launched by the Indian government in 2014. Under this initiative, Indore has made significant progress in promoting waste segregation and reducing landfill waste. The city has also implemented a door-to-door waste collection system, which has helped to improve the efficiency of waste collection and disposal.

In addition, Indore has launched several innovative programs aimed at promoting sustainable waste management practices. One such program is the Indore Municipal Corporation's (IMC) decentralized composting initiative, which involves setting up composting units in residential areas to turn organic waste into compost. The IMC also runs a program to recycle plastic waste into fuel, which has helped to reduce plastic waste and promote sustainable energy practices.

Another noteworthy initiative is the 'Garbage Cafe' program, which was launched in 2019. Under this program, people can exchange plastic waste for a free meal at designated 'Garbage Cafe' locations in the city. This program has not only helped to reduce plastic waste but also provides a valuable service to people who may be struggling to access food.

Despite these successes, there are still challenges in Indore's waste management efforts. For example, there is a lack of awareness among residents about the importance of waste segregation, and some people continue to dump waste in public spaces. In addition, there is a need for greater investment in waste management infrastructure and facilities, particularly in rural areas surrounding the city.

Overall, Indore's waste management efforts are a positive example of how innovative and sustainable solutions can be implemented to address pressing environmental challenges. By continuing to invest in waste

management infrastructure and promoting sustainable practices, Indore can continue to lead the way in waste management in India and beyond.

In this study , the focus is given to the waste management processes and programs conducted in the city of Indore under the municipal corporation of Indore and also about the socio-economic status of the sanitary workers and also enquires if they get any benefits from the government .

STATEMENT OF THE PROBLEM

There are only a few cities in India that has taken pride in their waste management processes. One such city is the city of Indore. Here from 2014 onwards the Indore Municipal Cooperation has taken the management of municipal solid waste into another level as a part of various schemes such as Swatch Bharat mission and so on. Hence the municipal corporation along with the help of various NGOs , has managed to build a very effective waste management system in the city which also provides employment for the natives ; specially to the people belonging to the economically weaker section of the city. This paper tries to analyse the waste management process in the city of Indore as well as to enquire about the demographic and the socio- economic status of the sanitary workers or the safai karmacharies in the city, who plays a great role in bringing Indore the title of the cleanest city of India. The paper also tries to analyse the special perks and schemes dedicated for the sanitary workers of the city.

RESEARCH QUESTIONS

The paper tires to find the answers to these 3 research questions given below;

1. What makes the waste management process in Indore different from the other cities in India ?
2. What is the socio – economic and demographic status of the sanitary workers in the city of Indore ?
3. Are there any schemes and policies to support the sanitary workers in the city ?

OBJECTIVES OF THE STUDY

The paper has three objectives of study and they are as follows ;

- 1.To analyse the waste management in the city of Indore and in what ways is it different from the other cities in India.
- 2.To analyse the socio-economic status and the demographic status of the sanitary workers in the city of Indore.
- 3.To study about the municipality programmes and schemes for the upliftment of the sanitary workers within the Municipality of Indore .

CHAPTER -2

LITERATURE REVIEW

The dissertation work “Planning Proposals for Solid Waste Management for the City of Bhopal “ by Jitendra Singh Saharwar (2007) discusses about the waste management process in the city of Bhopal and the problems due to unscientific waste disposals and dumping of waste in the landfill areas creating pollution in the environment, the paper also studies the ways in which the Bhopal Municipal corporation tried to manage the solid waste management problems in a fool proof manner. The study concludes that the waste management in the city is not proper and gives basic suggestions and recommendations such as collecting waste all to gather within every two days and collecting waste under two categories. The study hence is not sufficient as it neglects different approaches other than increasing the number of landfills and dumping of waste and basic treatments of solid waste treatments.

In a study conducted by Sushmita Mohapatra in 2013, titled “Technological Options for treatment of municipal Solid waste of Delhi” points out the various ways to collection and treatment of waste which was then in use. The article studies the advantages as well as disadvantages of the two-basic solid waste treatment which was used in the city, ie; thermo-chemical conversion and bio-chemical conversion. the other technologies that can be applied is not discussed in the paper , or in the suggestions and an idea on how the waste must be segregated in the base level is also over looked.

“Decentralised Solid Waste Management in India: A perspective on technological options (2013)” by Satpal Singh discusses about the problem of solid waste management in Indian cities. The solid waste management according to Mr.Singh is a critical service for the urban local bodies, since many public health issues are connected with it. The paper also discusses about Various technologies of waste disposal of recycling and management. It goes through all these given methods such as anaerobic digestion or biogas, recycling, reusing etc. and examines both its advantages and disadvantages. As the paper concludes is method of waste, disposal, recycling and reusing has its own has its own advantages and disadvantages. Septal Singh finally concludes that the decentralised approach could be one of the most effective methods to solve the problems of waste management in India as it has potential to reduce the quantity of waste of people and reduces the transportation cost as well as the traffic congestion and amount of pollution, and contamination of groundwater through seepage of latches. The recycling industries face a number of problems such as use and recycling of waste is labour oriented and inadequate, the processing of waste by small-scale industries is not compliance with requirements et cetera. The paper suggests that; to overcome these problems of solid, manage solid waste management, it should be promoted with the community participation along with the support of the Municipal corporation, and also points out that zero waste approach should be introduced to minimise the waste and consumption habits of people.

The paper “Sustainable Municipal Solid Waste Management in India; A policy Agenda” by Shyamala Mani and Satpal Singh (2015) discusses the scenario of municipal solid waste management in different headings such as waste generation, solid waste collection, transfer and transportation etc. it also addresses the technologies used for the treatment of solid waste such as composting , bio-methanation ,recycling ,RDF, gasification and numerous others. It also focuses on the legal and policy frame work for Municipal Solid Waste Management that includes Swachh Bharat Mission, Municipal solid waste handling rules-2000, and Draft Manual on Municipal Solid Waste Management. The paper also discusses the gaps in the Solid Waste management rules-2015 , and gives suggestions for the same.

“Socio – Economic status of Dalit women sanitary workers: A social work perspective” by R. Selvamani and Dr. D.Rajan (2015) focuses on the Dalit woman sanitary workers and their socio- economic background. The study points out that even if they are employed in the sanitary work, they face a lot of problems such as lack of proper housing or sanitation. The paper also focuses on the social work perspective and on the basis of the results and discussions it is crucial to understand the perspective of social work and sanitation. They provide sessions of connection, and suggests improvement needed for their condition. The paper yet overlooks their income from other sources and their expenditure on basic amenities.

The paper “Challenges of Urbanisation in India; A Review of solid Waste Management “published by Javaid Ahmed Bhat and Dr.Rubina Chodry , discusses about various ways in which the urban local bodies within the country treat their waste. It gives an overall review of the amount of waste produced in urban area and also compares it with the solid waste produced in the rural areas. It gives insight to various methods of waste treatment, and waste collection in current practice. As it discusses the increase in population in the urban area and the municipalities, the paper overlooks the chances of employment opportunities the Municipal Solid Waste management and Solid Waste collection centre could possibly offer to the unemployed and unskilled labours in the locality.

“Health problems among sanitary workers in Indore City and their Knowledge, Aptitude, and Practices Regarding preventive Measures taken at Workplace – A Cross sectional Study .” by Dr. A.K Khatri , Dr.Anubhuti Kunjur , Dr. Suraj Sirohi , Dr. Ishan Sanodiya and Dr. Sanjay Dixit in 2018 provides an insight about the health problems faced by the sanitary workers in Indore. The various health problems include respiratory diseases, injury due to sharp objects, intestinal diseases, allergies and other skin diseases. It points out many health precautions as well as many health facilities offered by the government, but also highlights the facts that since most of the workers come from a poor background and are largely uneducated, they face more problems. From this study it’s clear that most of the workers come from poor background and lacks basic amenities. From this rises a scope of studying their socio-economic background as well as their current work condition.

“A Study on Socio-Economic Status of Sanitary Workers” by G.Meena and Dr. T Priyanka points out the hardships of the sanitary workers , their health issues , living conditions etc. relating to their socio-economic pattern. They study about their educational background, gender, and the level of satisfaction was also carried out. However, the study fails to analyse their income pattern, and secondary sources of income and their social background.

In the paper “Scenario of Solid Waste Management in Indian context” by R.Rajput, G. Prasad and A.K. Chopra points out that as the population increases along with the increase in the growth rate of industrialisation, organisation and economic growth. The consumerism has been found very high. As the population increases, generation of solid waste has also increased in a very high manner. the paper discusses about various types of solid waste generation reach in different in cities. It points out the health impacts and solid waste management. The paper also cost through various ways of waste disposal options such as non-engineered disposal, waste composting, sanitary landfilling, incineration, reuse and recycling of waste materials, pyrolysis et cetera. Other than this paper fails to give suggestions on how the ways must be managed or how the life of the solid waste management workers or the sanitation sanitary workers are affected.

The paper “Health, Identity and Livelihood Status of Sanitation Workers in Bhubaneswar city Odissa”, by Ajith Kumar Lenka published in the year 2019 ; rightly points out the social and economic relation of people who engage in the sanitation work in the Bhubaneswar city of Odissa and about the prevailing caste system where the vast majority of the sentry workers are from social or economic minority class mostly oppressed people and are considered untouchables who are deprived of their social economical rights. The paper discusses the sanitary condition and health condition of the sanitation workers and various hazardous materials and gases with which they have to work when they are not given any protective gear or equipment. The paper also discusses about their economic status of the demographic status, along with their lifestyle habits. In conclusion he suggests various options such as introducing insurance policies, providing basic facilities like proper housing, electricity, water supply and sanitation facilities for the workers who are engaged in Sanitary work. He also emphasised that the government also need to provide safety equipment for sanitation workers, so that the incident of death and accidents can be reduced.

RESEARCH GAP

The various papers which has been reviewed mostly discusses about the waste management in India is insufficient and inefficient in managing the municipal solid waste produced in the country which increases day by day. Few papers also discusses about the sanitary workers ; specially belonging to the back ward caste and the difficulties they face. But non of the papers talks about their economic status , demographic status and the other policies and support they get from the government. The reviewed literatures also fails to analyse the income patterns and secondary sources of income of the sanitary workers. Hence , this brings in the scope of anew study where , an analysis of the processes of waste management in the cleanest city of India -Indore and also about the socio – economic standards of the sanitary workers is concerned.

METHODOLOGY

In this study, the waste management process in the city of Indore along with the socio-economic status of the sanitary workers and the policies in practice by the Municipal Corporation of Indore for the welfare of the safai karmacharies.

The process of the waste management in the city of Indore is studied by visiting the different site, from the method of collection from each household to the municipal solid waste treatment plants located in the Indore city. The processing of waste management is having been studies in person along with the details given by the NGO officials. The data for analysing the socio-economic status of the sanitary workers are in the study are collected as primary data by the method of survey using questionnaire and is analysed using Microsoft Excel.

CHAPTER- 3

WASTE MANAGEMENT PROCESS IN THE MUNICIPALITY OF INDORE

Indore, a city in the central Indian state of Madhya Pradesh, has been recognized for its successful waste management practices. In recent years, Indore has made significant strides towards becoming a zero-waste city.

One of the key factors in Indore's waste management success is its decentralization of waste management services. Instead of relying on a single centralized facility, the city has established several small waste management units across different neighbourhoods. These units are responsible for collecting and processing waste generated within their respective areas, thereby minimizing the transportation of waste across the city.

Another significant aspect of Indore's waste management is the segregation of waste at the source. The city has implemented a strict system for separating waste into different categories such as biodegradable, non-biodegradable, hazardous, and electronic waste. This separation has enabled efficient processing and disposal of different types of waste, reducing the amount of waste that ends up in landfills.

The waste segregation is the toughest part in waste management. In Indore the waste is segregated in to six different categories right from the point of collection. The citizens are responsible for the waste segregation right from the households itself. The Indore government has taken some extra steps when it comes to waste segregation as none of the other municipalities has taken the steps to collect waste into six different categories. In Indore the waste is segregated into:

1. Dry Waste
2. Wet Waste
3. Domestic Hazardous Waste
4. Domestic Bio-medical Waste
5. E- Waste
6. Plastic Waste

Other than just segregating, they have been assigned different colours for different type of waste, so that it is easy for the people to separate the waste accordingly. And it has been proven effective enough for waste segregation.

Type Of Waste	Colour
Bio-Degradable waste	Green
Dry Waste	Blue
Domestic Hazardous	Black
Plastic Waste	Light Blue
Sanitary and Medical	Yellow

Table:1 Colours assigned for Different type of Waste



Picture : 1 Public dustbin with colour code for each type of waste.

In this way the wastes are segregated and collected from each house holds by the help of waste collection vehicles which has separate compartments for each type of waste. The collection routes are planned to optimize collection efficiency and minimize transportation costs. The appropriate collection and transportation equipment are determined in an efficient way such that there is End-to-end implementation support for collection and transportation.

The municipality of Indore ensure that all activities are executed according to Solid Waste Management Rules, 2016 and subsequent amendments thereof and Swacch Survekshan Surveys, National Green Tribunal (NGT) & Central Public Health Environmental Engineering Organisation (CPHEEO) manual guidelines.

The IT Enabled monitoring systems is one of the most efficient way the municipality deals with the monitoring of the waste collection through out the area of Indore. The ISWM is headed by the members of the municipal corporation and they control the working of the ISWM. The Integrated Control and Command centre, Indore divides the city in to 19 zones. Each zone is monitored by each individual and they coordinate each of them. A 6+1 system is followed in the ISWM centre so that the absence of an employee the monitoring is done by another person. The control centre monitors the vehicles for waste collection using GPS Monitoring System.

Each and every vehicle used for the collection of waste is under the GPS surveillances and has special alert systems for directions and for stops more than five minutes, ten minutes, fifteen minutes and above; and are also colour coded for easy recognition which is then followed up through calls in order to make sure that there is no other problems. Each and every waste collection vehicle's speed is limited to zero to five kilometres per hour on the route and if the limit is increased the alert system is activates and them is followed up through calls.

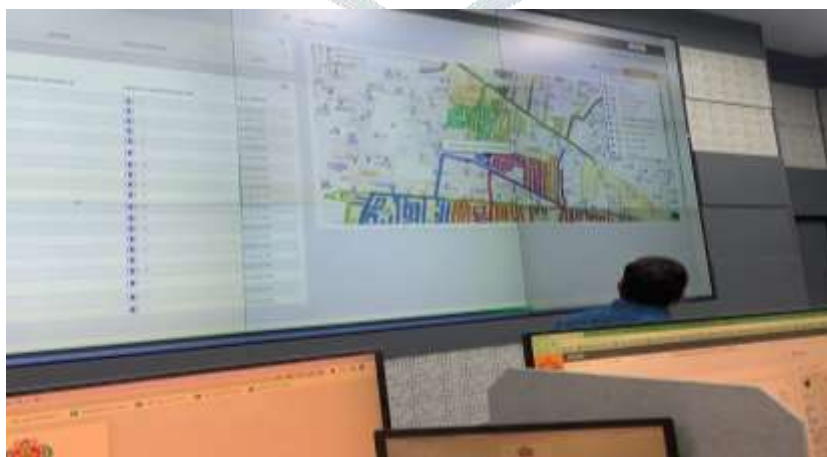
The data regarding the waste collection are updated on the daily basis. The GPS monitoring project worth 8 crores took nearly 3.5 years to be in working. The payment system is done by the government through the bank accounts of the employees.



Picture :2 The Integrated Command And Control Centre , Indore

Every single solid waste collecting vehicles is given a separate lane and has to cover it this static routes every day and is not allowed to deviate from the respective routes. If ever the routes are deviated or in case of any misbehaviours or accidents , strict actions are taken.

Real-time monitoring Using sensors and GPS tracking to monitor waste collection and disposal trucks in real-time, ensuring that waste is collected and disposed of efficiently and effectively. Data management and analysis Using software to collect and analyse data on waste generation and management, such as waste composition and disposal methods, to inform decision-making and continuous improvement of the SWM system. Electronic reporting and documentation Using electronic systems to document and report on the waste management process, including waste collection, transportation, and disposal, to ensure transparency and accountability. The Public participation by using mobile applications and online platforms for the public to take part in the waste management process, such as reporting littering and dumping, and providing feedback on waste management services.



Picture :3 Official showing the colour coding system and route map for collecting the waste.

The officers at the control centre make sure that the drivers reaches the collection points on time . The details of each and every worker along with their allocated routes are documented along with the other details such as the days of work, number of houses covered, etc. In the case of any inconveniences such as a vehicle breakdown, the centre immediately sends another vehicle to the site to carry on with the work. The vehicle which need repair is taken to the workshop to be repaired as soon as possible.

Now when, it comes to collecting the waste from the grass route level, the vehicles go through each and every assigned zones and cover the lanes on by one. These vehicles go through the residential area one time a day and they cover the industrial area twice a day. The vehicle passes through by a special alarm to make the people aware that the vehicle has reached for the collection. As a particular time is already set for the collection, the people are already aware and are ready to give of the segregated wastes. The wastes from each house are collected within few minutes as it the waste are already segregated within the house itself.



Picture :4 The waste collecting vehicle and its different compartments for waste segregation.

The organic waste which are compostable are also collected; but at most cases the household uses this organic waste to make organic compost to use as fertilizers for their plants. Each day's organic waste is added to the composting bucket which contain the starters for turning the waste into compost. Each and every house in the municipality of Indore has been given a bucket customised for composting. The houses which does do composting can also earn from thus ass they could sell the organic compost to others or can offer it to the waste management sector. Nearly 56,000 households make their own home compost. It takes around 40 to 45 days to make compost during summer days and 60 to 65 days to make the compost during winters.



Picture:5 Organic composting bucket.

Other than this method of waste collection, waste bins for different types of waste is introduced in each and every corner of the city and the wastes are also collected regularly. The sanitary workers rightly called as Safi Karma Charis are allocated for every 100 metres to sweep and collect the litters on the road and to keep the open areas rid of waste. They collect the waste in to three, that is; dry waste, organic waste, and plastic waste. Each sanitary worker who work on open areas such as roads and lanes work 8 hour per day on shifts. Their work starts early in the morning at 5 am till noon, and the next shift from noon to the evening. And all this waste collected are also taken to the waste collection centres in the city.

These workers are given special uniforms and other safety equipment such as hand gloves, boots etc as a part of personal hygiene. They all are given classes on how to collect waste and to keep up their personal hygiene and are also aware of their duties and are monitored by the NGO employees who guides them in order to maintain proper safety and cleanliness. The NGO assigns employees to monitor each lane separately and they make sure that there is no clashes among the sanitary workers and the residents.

Now, after the collection of wastes from the different sites they are transported to different municipal solid waste treatment plants. There are more than 10 MSW treatment plant in the city of Indore. In these treatment plants, the collected wastes are segregated for further treatments. There are vehicles and tankers into which these are separated in order to be taken to different sites where they are further processed.



Picture :6 The waste collection vehicle transferring the segregated waste to the larger container trucks.

Here, at the waste collection plant, the waste collected from different parts of the municipality is further collected in large piles and transferred into larger containers and trucks. These vehicles when once filled takes it to the processing sites. All the organic waste collected are transferred into a tanker, which then takes it to the organic waste treatment site. And all the dry waste, and other waste are collected in a truck which is then transferred to the dry waste management site.



Picture: 7 Energy bins in the collection facility

Once the vehicle reaches the collection point, the different kind of ways which are already segregated are collected at different areas within the collection Centre. From here, they are separated and are treated separately. the electronic waste which are collected separately are treated with care and then lesson recycled. The usable parts are kept for further reuse. The Dry waste that includes materials such as metals, glass containers, polythene covers, rubber, plastic etc are all collected in a separate vehicle and are transferred to the dry waste manufacturing sector in the city.

Once the vehicle reaches the organic waste manufacturing site, the wastes are wet waste are unloaded and are taken for further processing. the waste is separated on the bases of the quality of the wastes collected. Once this is done the waste are taken for composting in a giant container or the bio gas plant and then later within a few days it is converted into bio gas which is methane gas that can act as a clean fuel in auto mobiles and for cooking purposes. This bio gas that is produced are stored in separate cylinders for later use. Other than that, a gas station itself is operated by the organic waste management unit from where all the trucks transporting the waste are fuelled. It is also operated as a fuel station which is open for the public.



Picture: 8 Miniature models of the organic waste treatment plant along with the bio-gas treatment area.

Now once the bio gas is extracted, the left-over slurry is turned into organic compost which is then sold to the farmers at a low rate, thus encouraging chemical free organic farming within the farming community in the outskirts of the city.



Picture: 9 Bio- gas chamber and the gas station with in the wet waste treatment plant.

When coming to the dry waste management unit, which is situated close to the organic management unit; the dry waste is further segregated into various metals waste (such as tin, copper, steel and iron etc.), plastic waste (which are divides on the basis of microns it contains.), rubber waste, and other solid wastes. This are separated using the help of the conveyer belt, which basically separates the metal and non-metal wastes primarily. The rest of the non -metal waste are separates by had in to the given various categories and are then upgraded and recycled and the rest of the separated material ready for recycling is sent off to various recycling plants within the city,

The next is the concrete waste that is one of the biggest problems after demolishing old buildings in order to build new ones. These concrete wastes are taken in to the concrete waste management site situated close to the organic and dry waste manufacturing sites. Here the concrete waste is broken into manageable. Once broken into manageable size the iron rods are removed and the concrete waste are further broken down and are powdered. This powdered concrete is then mixed with the new concrete in the ratio 40:60, where 40 % the powdered concrete waste is mixed with 60% of the freshly mixed raw concrete. This special mixture of concrete is used to make the walls, sidewalks, concrete tiles etc.

In these ways the municipality of Indore manage to deal with metric tonnes of waste generated in the city. Other than just waste management, it provides employment opportunity for the low-income groups who comes under the category of unskilled labour. The municipality along with the NGOs together make sure that the workers are given proper safety equipment's such as boots, hand gloves, over coats, hats, face mask to protect from the pollution and dust etc. and is made compulsory to use these equipment's while at work. The workers are well aware of their rights and are given classes about the various ways of waste segregation, collection and the ways in which they are treated, thus making it easy for them to work with efficiency.

CHAPTER-4

SOCIO-ECONOMIC STATUS OF THE SANITARY WORKERS IN INDORE

The sanitary workers in the city of Indore is very hardworking and cooperative in nature. They mostly belong to a poor background with a low level of income and often lack literacy and hence have got no other opportunity than working under the municipal waste management system. Here, the one thing we could notice in all the parts of India is that, mostly 90% of the sanitary workers are from the same background without proper literacy, lack of proper amenities, and mostly belong to the lower castes. This can also be said as the effect of the deep-rooted problem of the caste system in India that divides people on the basis of their caste which discriminates them according to their occupation. Other than that, the problem of economic inequality is a harsh reality leaving a large number of people without proper housing, living condition or a proper job.

Considering all this, the study focuses on the socio-economic and demographic background of the sanitary workers in the city of Indore through a survey questionnaire which is specially designed to understand the conditions of the sanitary workers in the city. A total of 51 respondents answers has been recorded and the analysis is done with these data that has been collected through the survey method. The one point to be noted is that the population is largely homogeneous in nature and hence more or less the data collected shows similarity between reach respondent.

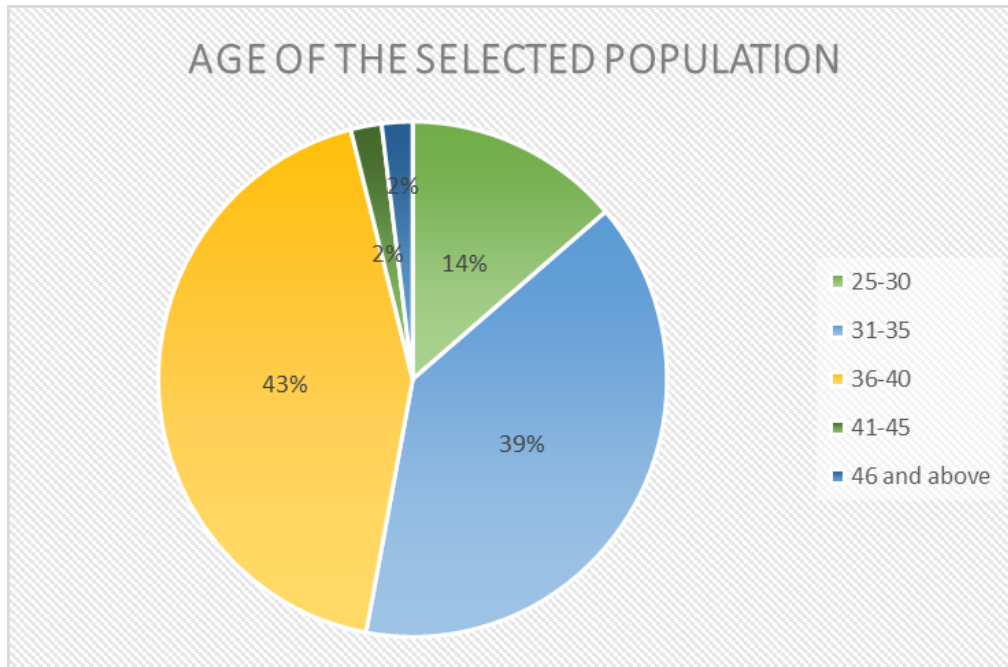
DEMOGRAPHIC STATUS

1. First, the analysis is done regarding the age of the sanitary workers. The age range is divided from 25 to 30, 31 to 35 ,36 to 40, 41 to 45, and 46 and above. The results of the survey are as given below.

AGE CATEGORY	NO. OF PEOPLE
25 – 30	7
31 - 35	20
36 - 40	22
41 - 45	1
46 and above	1

Table: 2 Age categories of the respondent population.

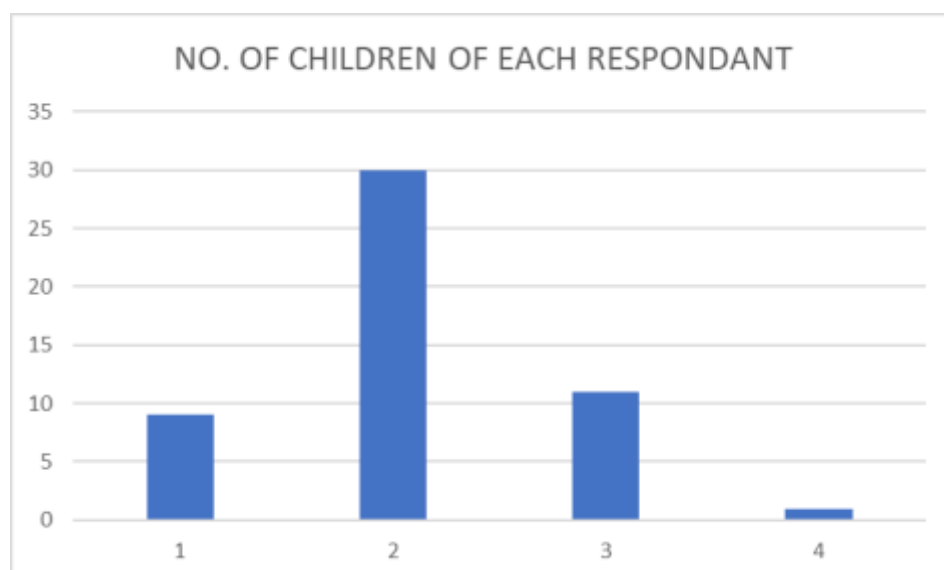
As per the table it can be understood that a large number of the respondent population belong to the age category of 36 to 40 years of age and the second highest id the respondents from the age group 31 to 35 years of age.



Graph: 1 Age of the respondent population.

The graph points out that the people from the age category 36 to 40 years of age covers 43%, people from 31 to 35 years of age covers 39 % and people from the category of 25 to 30 years of age covers 14 % and the rest of the people from the age category 25 to 30 years and 46 and above covers 2% each.

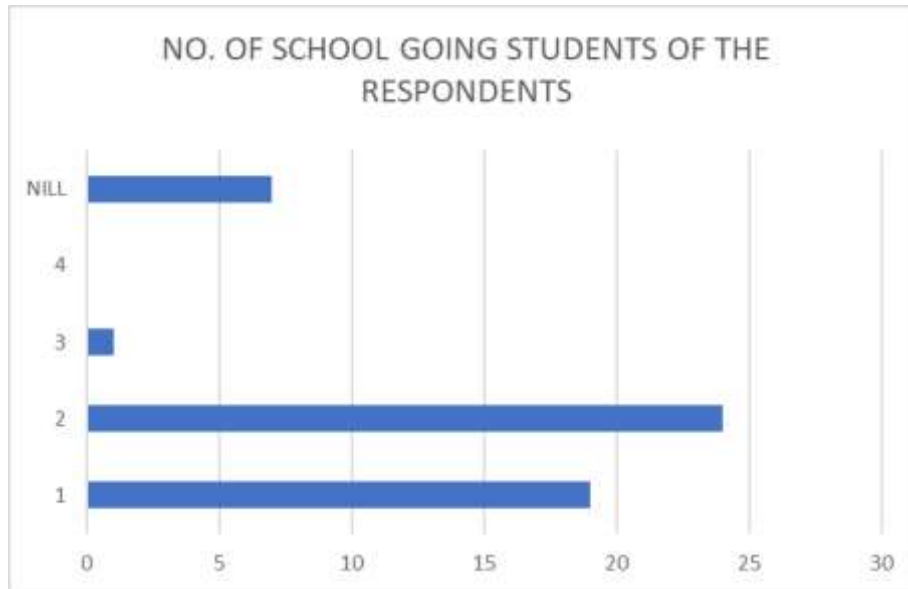
2. Out of 51 respondents, 30 respondents were women and 22 were men. As per the employment records of the NGO there are more number of women enrolled in the sanitation work rather than men.
3. Thirdly, in thus section the number of people who are married out of the taken population is analysed. As of the observations all the respondents were married and has children. Even though there were 2 people who were widowed from the last few years.
4. Fourthly, since all the respondents are married the number of their children and whether they are school going or not is also analysed in order to get an idea about the structure of expenditure in the household.



Graph:2 Number of children of each respondent.

From the graph, it is understood that the majority of respondents (30) have two children each. All the respondents have children and out of them a majority of the children are school going.

From the below given graph, nearly 44 children are school going. Out of 51 respondents, 24 of them have at least 2 school going students in their family. 14 of them have at least one school going student. 1 has three school going students, and there are only 7 respondents with no school going students.

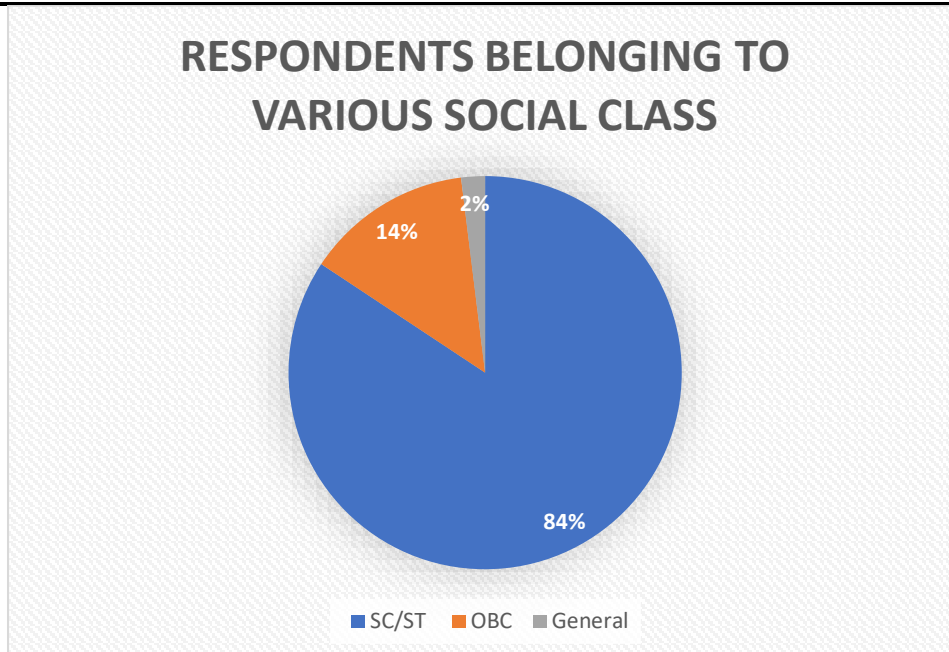


Graph: 3 No. of school going students of the respondents.

5. Fifthly, the number of people coming from a joint family and a nuclear family are distinguished accordingly. A vast majority are having a nuclear family. And has a maximum of 6 members and a minimum of 3 members in their families.
6. Finally, the study analyses about their social class; that means whether they belong to the Scheduled Caste (SC) /Scheduled Tribe (ST), other backward class (OBC), or general (G) categories.

SOCIAL CLASS	NO. OF RESPONDENTS
SC / ST	43
OBC	7
General	1

Table: 3 The number of respondents from various social class backgrounds.



Graph: 4 Percentage of respondents belonging to various social class.

- The respondents are all following Hinduism, which is the largest religious population in Indore (83.26%) according to the 2011 census report.

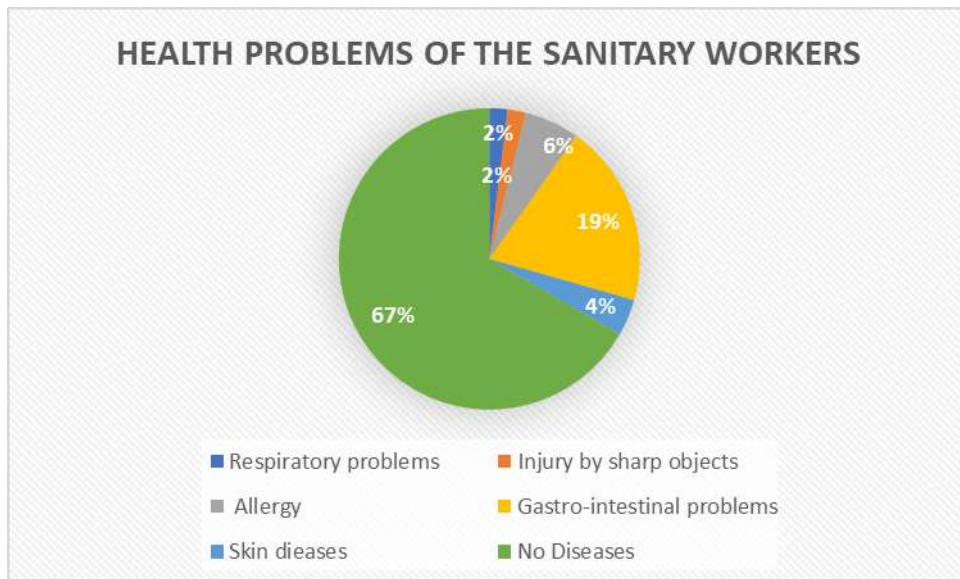
SOCIAL STATUS

The social status is analysed by the availability of the basic factors such as cooking gas, electricity, vehicles, type of house, literacy level and so on. The results are as follows:

- The social status is firstly analysed by the basic factor; that is the poverty line. All the people working in the waste management sector live below the poverty line, and hence have access to the basic amenities such as food, water, shelter and hygienic living conditions.
- Secondly, the structure of their house is taken into consideration; whether they live in a kutchha or a pucca house. The respondents all answered that they live in concrete houses even though they are small. This means that most of them live in a pucca house.
- Thirdly, the electric supply to each house was taken into consideration. The houses of all the respondents were having proper electric connection.
- Fourthly, an enquiry about the method of cooking was done, in which the population responded that all of them have gas connection in their house for cooking purposes.
- Fifthly, the ownership and use of private vehicles were analysed. There are only 143 respondents who own a vehicle. All of the workers who gave a positive response pointed out that they only have two wheelers. Which means none of the respondents own four wheelers.
- The next step was to analyse their health condition. The municipality provides free health check-up once in every three months and the workers are given proper medication if diagnosed with any health issues. The respondents were asked of the following illnesses, and the ones they are diagnosed with are noted through the survey.

HEALTH PROBLEMS	NO. OF RESPONDENTS
Respiratory problems	1
Injury by sharp objects	1
Allergy	3
Gastro-intestinal problems	10
Skin diseases	2
No Diseases	34

Table:4 The health problems of the sanitary workers in Indore.



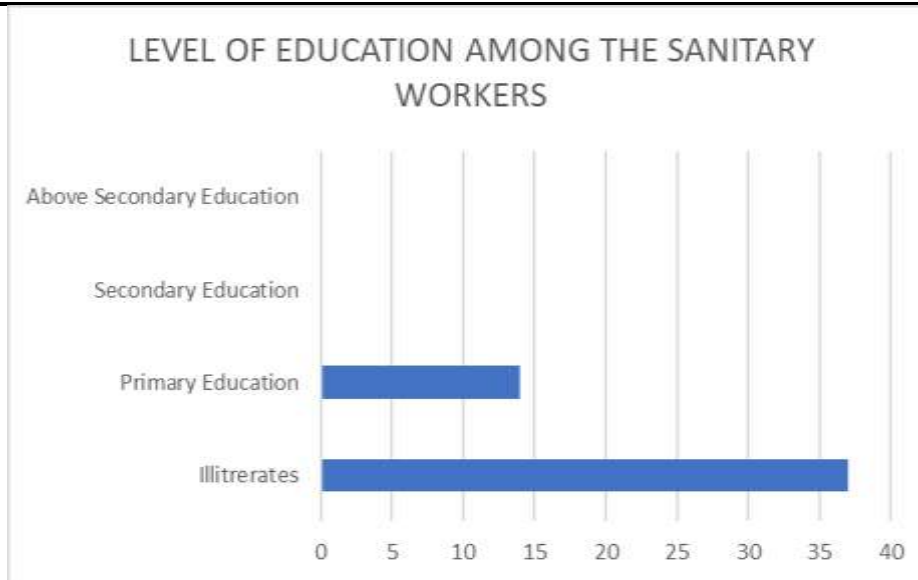
Graph:5 Percentage of sanitary workers having various health problems.

As per the survey done, the majority of the respondents do not have any serious health issues and constitutes 67%. Nearly 19% of the respondents are struggling with gastro-intestinal problems. A 6% of the respondents are struggling from various kinds of allergies and a 4% of the respondents suffer from skin diseases and 2 % of respondents suffer from respiratory problems. The respondents who has injuries due to shape objects is 2%.

7. Finally, an analysis of their educational qualification was done through the survey. The results are as given in the table.

EDUCATIONAL QUALIFICATION	NO. OF RESPONDENTS
Illiterates	37
Primary Education	14
Secondary Education	0
Above Secondary education	0

Table: 5 Educational Qualification of the respondents.



Graph: 6 The level of education among the sanitary workers in Indore.

From this it can be analysed that most of the sanitary workers are illiterates (37 respondents) and the rest (14 respondents) are qualified only in the primary level and hence all are unskilled labours.

ECONOMIC STATUS

The economic status of the respondents is analysed through various questions regarding their monthly income, perks from the government through various schemes and savings pattern of the respondents,

1. The area of the work of each respondent is first identified. They are categorised into sweeping and waste collection, driving municipality solid waste collection vehicles and lastly working under treatment plants.

AREA OF WORK	NO. OF RESPONDENTS
Sweeping and waste collection	32
Driving municipality vehicles	10
Working under treatment plants	9

Table:6 Areas of work of the respondents.

The table shows that out of the selected respondents, 32 of them work as sweepers and collect the waste from the roads and public places. 10 of the respondents are municipal waste collection vehicle drivers and thus collect the household and industrial waste throughout the day. The rest of the respondents are working in the waste management plants

2. The years of experience as a sanitary worker or as safai karma Chari of each respondent is also taken into consideration.

YEARS OF EXPERIENCE	NO. OF RESPONDANTS
Less than 5 years	6
5 to 10 years	38
Above 10 years	7

Table:7 Years of experience of the sanitary workers

From the table it is evident that most of the workers have a work experience ranging between 5 to 10 years.

- The previous employment of the respondents was also taken into consideration and if they were working in another sector before getting employed as a sanitary worker then their income then is also analysed. Only four of the respondents were previously employed. Among them two of the respondents received salary less than 7000 rupees, and the rest two were having salary more than 7000 rupees.
- The current income of the respondents from the waste management sector is analysed. The point to be noted is that these workers are directly paid through bank by the Indore Municipal Corporation.
- The monthly expenditure details are also collected through the survey. As per the analysis, all the respondents used to expend all their monthly income on various needs such as food, health, education of the children if any, rents, loans etc.
- An enquiry about an extra income source was also done in order to study the economic status of the respondents. As the responses are considered, the respondents do not have a secondary source of income and hence is solely dependent upon the income from the waste management sector.

CURRENT INCOME	NO. OF RESPONDENTS
7000 RUPEES	13
7500 RUPEES	15
8000 RUPEES	15
8500 RUPEES	9

Table:8 Current income of the respondents.

Around 13 respondents have 7000 rupees as their current monthly income. 15 respondents have an income of 7500 rupees and another 15 respondents have a total of 8000 rupees as their current monthly income. People with more years of experience has a monthly income of 8500 rupees from the waste management sector.

- Now, when it comes to other earning members in the family most of the female respondents who are married replied that their husbands do earn, but in the case of male respondents and the widows, they are often the only earning member in the family.
- As pensions and other perks from the part of the government are considered, the 2 widows among the respondents get widow pension time to time. Now concerning the governmental perks, each and every sanitary worker are provided with free medical check-up every three months and are also eligible for subsidies specially in the medical sector with in the Indore municipality.

9. Finally, when it comes to the savings habit of the respondents, all of them responded that there is no savings habit in any of the households of the respondents. This means that all they earn are expended in the very month leaving them with nothing to save. As the expenditure increases day by day these workers, even if they spend only for the basic expenses they are left with nothing in the form of savings.

CHAPTER - 5

CONCLUSION

The waste management in the Municipal corporation of Indore is one of a kind. The Municipality not only focuses on the Municipal solid waste management, but also on providing employment opportunity for the unskilled labours who are often left behind. Being the cleanest city in India for the sixth time consecutively, the Indore model of waste management is one of the most convenient and productive way to deal with the Municipal solid waste generated in the city. The city generates almost 700 tons of wet waste which is converted into bio-gas and organic fertilizers, and 1,200 tons of dry waste which are recycled and reused; every day. The government not only deals with the problem of waste management b, but also earns a good profit from the by products such as bio- gas, fertilisers etc.

The most important part is the employment generation through waste management. As said earlier, the unskilled labours who were before unemployed and often exploited; now has a monthly income with incentives and subsidies. The Indore Municipality also makes sure that the sanitary workers are well equipped with the safety equipment given to them. The Municipality also provides health check-ups once in every three months to ensure the wellbeing of the sanitary workers, and all of this worker are enrolled in special schemes with subsidies for their betterment.

When it comes to the socio-economic factor, from the study we could conclude that the majority of the sanitary workers population is from lower castes specially the SC/ST categories and are all from the economically backward class. They are illiterate and lack proper education and are hence unskilled labours. As far as the savings pattern is analysed, they do not have any savings as they are caught up with day to day expenses for the basic amenities such as food, water, health care, sanitation etc.

In order to conclude, the Indore municipal corporation has taken to consideration not only the waste management, but also the betterment of the sanitation workers without whom the project of attaining a clean city would not be possible.

SURVEY QUESTIONNAIRE

(A STUDY ON WASTE MANAGEMENT AND SOCIO- ECONOMIC STATUS OF THE SANITARY WORKERS IN INDORE)

NAME OF THE RESPONDENT:

I. DEMOGRAPHIC STATUS

1. Age:
2. Sex:
3. Marital status:
4. If married, number of children:
5. School going students if any:
6. Whether nuclear or joint family:
7. How many members are there in the family:
8. Number of senior citizens in the family:
9. Social class:
10. Religion:



II. SOCIAL STATUS

11. Are you living below the poverty line (BPL)? Yes or No
12. Whether living in kutcha house or pucca house?
13. Do you have electric connection in your house? Yes or No
14. Whether having gas for cooking? Yes or No
15. Do you have any vehicle of your own?
if yes, is it a 2-wheeler or 4-wheeler? Yes or No
16. Do you have any health problems? Yes or No

If yes, is it ;

- a) respiratory problems
- b) injury by any sharp objects
- c) allergy
- d) gastrointestinal problems
- e) skin diseases

17. Educational Qualification
 - a) illiterate
 - b) primary education
 - c) secondary education
 - d) above secondary education

III. ECONOMIC STATUS

18. What Is the area of work?
 - a) Sweeping and waste collection
 - b) Driving municipality vehicle
 - c) Working under waste treatment plants

19. How many years of experience as a sanitary worker?
 - a) Less than 5 years
 - b) 5 to 10 years
 - c) Above 10 years
20. Whether previously employed before being a sanitary worker.
If yes, what was the income earned.
21. What is the current income from sanitary work?
22. What is the monthly expenditure?
23. Any other source of income? Yes or No
If yes, how much income is earned?
24. Are there any earning members in the family?
If so how many members are earning?
25. Do you or any members from your family receive any kind of pensions or such perks from the government?
Yes or no.
If yes, under what scheme and how much amount is received?
26. Is there any savings habit in the household?

REFERENCES

1. LENKA, AJITH KUMAR (2019). "Health, Identity and Livelihood Status of Sanitation Workers in Bhubaneswar city Odisha" IJRAR Vol. 6, Issue :2
2. MOHAPATRA, SUSHMITA (2013). "Technological Options for treatment of municipal Solid waste of Delhi". INTERNATIONAL JOURNAL of RENEWABLE ENERGY RESEARCH. Vol. 3, No. 3.
3. MANI, SHYAMALA SINGH, SAPTAL (2015). "Sustainable Municipal Solid Waste Management in India; A policy Agenda" INTERNATIONAL CONFERENCE ON SOLID WASTE MANAGEMENT, 5IconSWM 2015
4. SAHARWAR, JITENDRA SINGH (2007). "Planning Proposals for Solid Waste Management for the City of Bhopal" Indian Institute of Technology, Roorkee.
5. SINGH, SATPAL (2013). "Decentralised Solid Waste Management in India: A perspective on technological options". CITIES – THE 21st CENTURY INDIA. Chapter- 12
6. SELVAMANI, R. and Dr. RAJAN, D. (2015) "Socio – Economic status of Dalit women sanitary workers : A social work perspective" EMPOWERING PEOPLE: EFFECTIVE SOCIAL WORK APPROACHES & STRATEGIES Vol. 5 , Issue: 12
7. <https://www.downtoearth.org.in/news/waste/india>
8. <https://www.outlookindia.com/national/india>
9. <http://feedbackfoundation.in/6-way-segregation-in-indore/>