

Role of Swachh Bharat Mission In Municipal Solid Waste Management In Patna, Bihar

Dr. Subhash Anand*, Ekta Raman, and Usha Rani

Department of Geography, Delhi School of Economics, University of Delhi, 110007. India

*Corresponding author

Dr. Subhash Anand, Associate Professor, Department of Geography, Delhi School of Economics, University of Delhi, 110007. India. E-mail: sanandpvs@yahoo.co.in

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Abstract

This study is going to deal with the perception of people about solid waste and the initiative of Swachh Bharat Mission in Patna. Solid waste management is the biggest issue of global. Population of area are continued to rise and consumption pattern are changing. The health and environmental implications associated with Solid Waste Management increasing at high level, mainly developing countries because they are not able to manage the waste properly. India is the second highest ranking country in term of population and the most purchasing power country in the world. Solid Waste Management in Patna is very poor stage. The waste generally disposed on the roads by the households and subsequently collected by street sweeping staff of Patna Municipal Corporation by JCB. The proper required equipment is not available in the Patna Municipal Corporation Department. Patna has many issues related to Municipal Solid Waste such as lack of infrastructure, unavailability of dumping space for garbage, less number of municipal worker, Gender discrimination in cleanliness, awareness of cleanliness, unwillingness of people for maintaining the cleanness, eating habit especially Pan eaters spit all over the street.

Keywords: Swachh Bharat Mission, Municipal Solid Waste, Environmental Problems

Introduction

Solid waste can be defined in terms of unwanted residues, solid or semi-solid that are thrown away by domestic, industrial and commercial sectors. The words rubbish, garbage, trash or refuse are often synonymous when talking about solid waste. "Solid Waste" is applied to unwanted and discarded materials from houses, street sweepings, and commercial and agriculture operations arising out of mass activities Solid waste consists of any refuse, sludge from wastewater treatment plants or air pollution control facility or other discarded materials, including solid, small amounts of liquid, semi-solid or contains gaseous materials resulting from industrial, commercial, mining, and agricultural operations and from community activities [1].

Generally Municipal Solid Waste is a heterogeneous mixture of paper, plastic, cloth, metals, glass, organic matter etc. Generated from the various sources. Municipal solid waste includes commercial and residential wastes generated in the municipal or notified areas in either solid or semi-solid waste from excluding industrial hazardous waste, but including treated biomedical waste [2].

India generates 160,000 Metric Tons of Municipal Solid Waste daily. Per capita waste generation in cities varies from 0.2kg to 0.6kg per

day depending upon the size of the population. This is estimated to increase at 1.33 per cent; the total waste quantity generated by the year 2047 is estimated to be about 260 million tons per year [3]. Solid waste can be defined in terms of unwanted residues solid and semi- solid that are thrown by domestic, Industrial and commercial sectors. Urban solid waste consists of household wastes, construction and demolition debris. Solid waste can be defined as a mixture of vegetable and non- vegetable matter, paper, plastics, rags, fabrics, ash and various kinds of biodegradable and non – biodegradable matter; these are known as solid waste materials.

Centre for science has estimated that Bihar currently produces over 2500 tonnes per day (TDP) of solid waste, about 10,00,000 lakh annually Patna is the worst in term of solid waste management Patna alone accounts for 42%, Bhagalpur, 12%, and Muzzafarpur 10% Patna generates 680-850MT/d. Patna generates waste average per capita of 331 gm/d [4].

Due to rapid growth of urbanization, population and changing pattern of dwelling and lifestyle of the people, have given rise to generation of waste in larger quantum. This has resulted in tremendous growth of environmental problems. Municipal or urban solid waste generation continues to grow both in per capita and overall terms. The management of urban solid waste is now vested mainly with the Urban Local Bodies in India and many countries are enacting rules and regulations concerning the adequate and efficient management

of urban solid waste and to tackle the problem of funding the finance for solid waste management.

The Total Sanitation Campaign of cleanliness in India was started in 1999 by the Government of India in order to restructure the Rural Sanitation Programme. Nirmal Gram Puraskar was started in the month of June in 2003 as a sanitation programme to boost the Total Sanitation Campaign. It was an incentive scheme launched by the Government of India in 2003 to award people for total sanitation coverage, maintaining clean environment as well as making villages open defecation-free villages by the Panchayats, Blocks and Districts. Nirmal Bharat Abhiyan (NBA) was started in 2012 and Swachh Bharat Abhiyan in 2014 on 2nd of October. Patna got 4th rank in the dirtiest city in India and known as the dirtiest capital of India according to the 'Swachh Survekshan-2016' survey. Seventy three cities surveyed for cleanliness have been categorized based on the marks scored by each of them in the 'Swachh Survekshan-2016' survey. The cities were evaluated on five parameters – waste collection, solid-waste management, construction of toilets, sanitation strategies and behavioural change communication. The rankings are based on the data provided by municipal corporations, independent assessors and feedback from people.

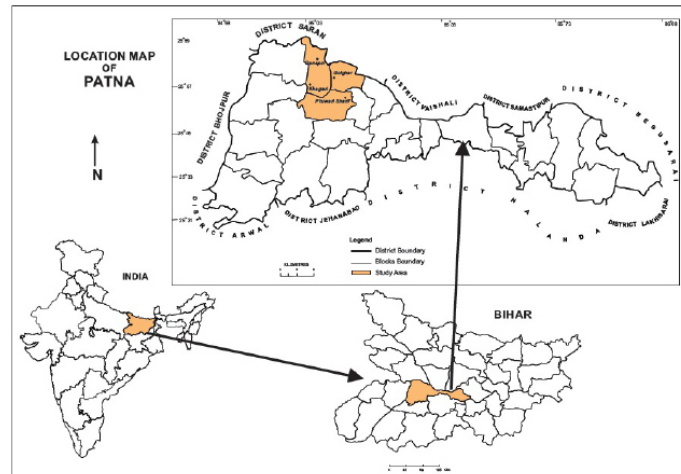
Statement of Problem

The purpose of this study is to find out the current Solid Waste Management in Patna. Local people of Patna manage garbage and what are the changes come after the introduction of Swachh Bharat Mission in Patna, what are the behavioural changes came in people of Patna what are the perception of the people of the Patna how much they are aware of the solid waste management process. Patna inhabitants manage their garbage, how they feel about the possibilities for future improvement and the factors which influence the formation of their waste management practices. Patna has a lot of problems of solid waste disposable, absence of segregation of waste at source, door to door collection very few seen in the area.

Lack of technical expertise and appropriate institutional arrangement. Unwillingness of urban local body to introduced proper collection, segregation, transportation, treatment disposal system. Indifferent attitude of citizen towards waste management due to lack of awareness. Lack of sufficient funds with urban local bodies. In Patna waste management, such as segregation, collection, transportation, treatment and disposal, waste generation per capita, disposal facility all processing is done by manually and very low and old method are used by municipal workers. This leads to occupational health risk to the rag picker and municipal worker. Mismanagement of waste leads to many environmental and health problems for local people of Patna. Awareness is the key to ensuring community participation in development projects [5]. There is very lacking awareness about the cleanliness in Patna, people are very insensitive in keeping the city clean they throw the garbage on the roads because of lack of dustbins and insensitivity towards nature. Very few advertisements for cleanliness which also limited to the famous area of the city. At present 1000-1200 TPD waste generated every day, per capita generation is approx.450 gm to 600 gm per day. It was 1010 TPD in 2011. It has been estimated that in coming years, this generation quantity bound to increase. The Ghats remain covered with litter and garbage while the people and the government play the blame game. On one hand the government are appealing to the people to keep their environment clean, but on the other side people blame the

government and the management for not providing any dustbins at the Ghats. Waste lies piled up on the steps of the Ghats and people are seen washing clothes and bathing in the river. Idols of gods and goddesses are a common sight in the garbage piles. People often bring these idols to immerse in the river Ganga but since it is forbidden now, they leave it at the sides.

Study Area



Census of india ,(2011)

Patna which ancient name is 'Patliputra' was the capital of 'Magadha' is located between the latitude 25°30'N to 26°45' N and longitude 85°0' E to 85°15' E. It is along the southern bank of river Ganga. The Patna district is comprises in six sub divisions. This research was done in The research methodologies were taken both qualitative and quantitative. The quantitative method comprises statistical representation and diagrammatic representation of information with the help of Microsoft excel. The qualitative method comprises the information related to solid waste management and Swachh Bharat Mission in Patna and the perceptions of people about the "Swachh Bharat Mission" in Patna.

area such as Golghar, Khagual, Danapur, Phulwari Sharif. Patna city is governed by Municipal Corporation which comes under Patna Metropolitan Region. As per the Census of India, Patna population in 2011 is 1,684,222, of which male and female are 893,399 and 790,823 respectively. As per the Census 2011 the Child Sex Ratio of Patna is 877 the average literacy rate of Patna city is 83.37per cent. The male literacy rate is 87.35per cent and the female literacy rate is 78.89 per cent in Patna. Khagaul is a city and a municipality in Patna district. Ancient time Khagaul was called as Kusumpura. Khagaultotal population 48,330 [6]. Phulwarisharif is in Patna district. It had great importance in history the civilisation of the city dated back to the days of inception of the sufi culture in india. Most of the sufi sant has visited the Phulwari Sharif in ancient time. All India institute of Medical sciences Patna is located in Phulwari Sharif. Phulwari Sharif has population of 81,740 [6].

Danapur is a part of Patna Metropolitan Region it is a satellite town of Patna. The population is 182,241 as per census 2011. Danapur is also known as Dinapur. It has various historical buildings of British rule. Golghar Mohallah is nearby river Ganga and many garbage are dumping near the river Ganga. Danapur and Khagual area are developing most of the agricultural land is converted into

residential land which leads to increasing number of population. Where Municipal are not working properly people are managed their waste themselves they dump it any vacant field in their locality. Phulwari Sharif has a wholesale vegetable and fruit market which creates many wastes such as left many biodegradable vegetable and fruits this area people are low income class and they hardly think of cleanliness and at the same time municipal worker also not working properly.

Aim and Objectives of the Study

The research methodologies were taken both qualitative and quantitative. The quantitative method comprises statistical representation and diagrammatic representation of information with the help of Microsoft excel. The qualitative method comprises the information related to solid waste management and Swachh Bharat Mission in Patna and the perceptions of people about the “Swachh Bharat Mission” in Patna.

The purpose of the present study was to understand and analyse the role of Swachh Bharat Mission on Municipal Solid Waste Management in Patna. Which included all functional elements and from generation to final disposal and covering processing of waste. The study also made an assessment of people’s opinion regarding Swachh Bharat Mission and impact of solid waste on environment.

1. To assess the Awareness in people of current solid waste management practice in Patna.

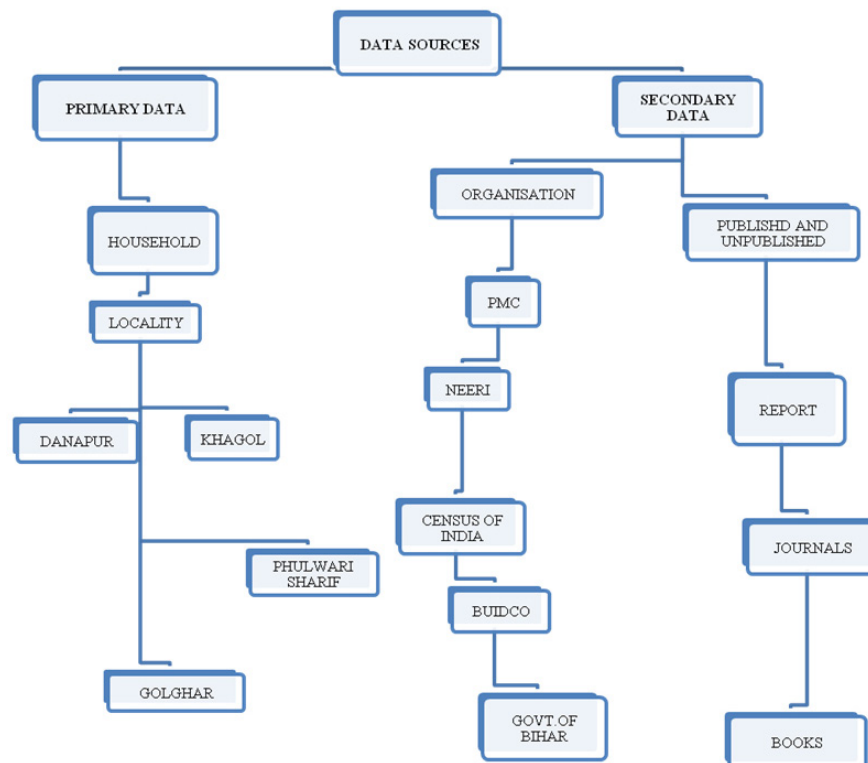
2. To assess the perception of people of the role of Swachh Bharat Mission on Solid waste management in Patna.

Data Source and Research Methodology

The present study is required appropriate primary as well as secondary data and information. A good research cannot be complete without the field observation and primary investigation and the ground reality cannot be understood without the interaction with the people who are facing the problem.

The primary data were collected from open interview schedule where all important issues were asked. The primary survey was conducted with 10 open interview schedules with respondents from different age group and different class locations such as Golghar, Mohallah, Khagaul, Danapur, Phulwari Sharif. These questions are specifically major concerns such as the role of Swachh Bharat Mission in Solid Waste Management and how they manage the Solid Waste at local level and institutional level.

The survey was done in the month of July and August 2017. The secondary information collected from Literature Review various books, newspaper and the research paper were collected from Patna Municipal Corporation, BUIDCO, Census of India, CPCB, SPCB, JNNRUM, Ministry of drinking water and sanitation was consulted.



Results and Discussion

After the collection of chunk of data and analysing those data research came many interesting information about the Solid Waste Management in Patna and the new initiatives of Swachh Bharat Mission. Swachh Bharat Mission includes six objectives and Solid Waste Management is one of them and this research focus on only solid Waste Management issue.

Generation, Collection, Segregation and Transportation of Solid Waste

Generation of waste

Domestic and commercial garbage, including abattoir and market wastes, along with street sweepings and drainage channel silt, are the responsibility of local governments [7]. The generation of waste is increasing because Patna is the most important part of Bihar people come here from the various corner of Bihar for different purpose like health check-up, education and employment all three pull factors play a vital role to increasing the population of Patna, increasing population leads to urbanisation more construction of houses and many goods items are manufactured to fulfil its demand, again this leads to increase garbage in the town. Patna generates 680-850MT/d.



Figure 1: Generation of waste (Source: BUIDCO, 2014)

Patna generates waste average per capita of 331 gm/d. The waste generation trend is shown from the below (Fig.1) chart says in 2011 it was 1000TDP and till 2036 it would be cross the 2500TDP. This would challenge for the state to manage this amount of waste if it could not be managed properly then it would be a big threat to the environment and society.

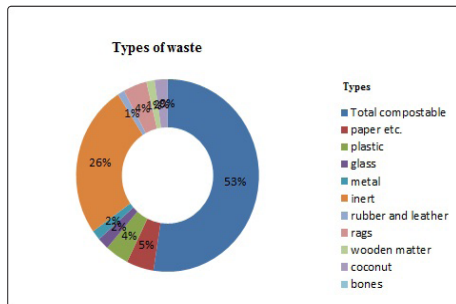


Figure 2: Type of waste (Source: BUIDCO,2014)

Garbage generates from various sources like market place, hotels, residential colonies, institutions etc. Most of the garbage generated from Patna because its population density is very high. (Fig. 2.) There are different types of garbage found in area like plastic, tin, wood, fruits and vegetable residue, paper etc.

Collection of waste

Patna garbage collection (fig.3) done by the Patna Municipal Corporation. In Golghar area garbage collection done by door to door everyday once in a day. Person come with handcart and takeall garbage from every household but they don't segregate properly. People of Golghar collect their garbage in any plastic carry bag which is also not one which has prescribed by Govt. Khagol area people say that there is no door to door collection done by municipal worker. People throw their garbage in any vacant field and some time it creates many health and environment issues like smell all

over areas and help in breeding insects (mosquitos and fly) which again lead to increases Malaria and other cholera diseases. When it was asked in an interview about the health status, they admitted they often suffered from these diseases.

Phulwari Sharif has a big fruit and vegetable market this is the reason this area generate most of the biodegradable items, quantity of garbage is very high area is not much developed collection of waste is not done properly and hardly segregation step has taken by the municipal worker. Danapur is the satellite town of Patna so new residential area some of the parts of its developed and some of them are in village in nature, so which part are developed there are municipal workers collect the waste from the households.



(Source : Primary Data, 2016-17)

Figure 3: Different garbage collection means and garbage point

(A) JCB collecting garbage from local collection point at Khagol; (B) door to door waste collection by Handcart at Golgharmohallah and (C) Sweeper collecting plastic bottles at Danapur Railway Station(from left to right),

Segregation of waste

Waste segregation at the time of door to door collection from household is not done in any of them area. Research found that nobody segregate waste into dry and wet waste neither in biodegradable and non-biodegradable waste. Many people were aware of segregation of waste and they have seen at public places both types of bin, but because of lack of willingness in people they don't follow it, which become problematic for the worker who collect the waste.

Transportation of waste

Most of the garbage collected and transported (Table 4.1) by the Handcart, Handcart help in used to collection of garbage from the narrow and the congested lanes especially in Gholghar Mohallah, street are very compact and narrow so handcart the only option to carry the garbage at the point of generation.

Table: 1 List of waste carriers

Type of Carriers	Number of Carriers
Tractor	121
Tipper	27
Loader	02
Excavator	10
Mini loader	05
Jetting M/C	03
Suction M/C	01
Tata 200(Palkon)	02

Source: PMC, 2014



(Source: Primary Data, 2016-17)
Figure 4: Type of waste carriers

JCB collect the garbage from the collection point of garbage “collection point” means a place nearby any street on road where people dump their garbage. JCB comes twice in a week to collect the garbage or some area like Gholghar every day in the morning. Most of the people said that transportation of waste done it very ill manner because vehicles are not covered so it creates a bad odour in the environment and many times due to wind many garbage spared on the road.

Dumping of waste



(Source: Primary Data, 2016-17)
Figure 5: Dumping of waste

(A) Solid waste accumulated along the drainage system in Khagaul, (B) Solid Waste accumulated in a vacant field in Danapur and (C) Solid Waste accumulated along the road at Golghar (From left to right),

Solid waste disposal (fig. 5) is the most and the critical and directly affects the human health. Improper disposal of waste can create the serious environmental problems (c). The waste generally disposed on the roads by the households and subsequently collected by street sweeping staff of the Patna Municipal Corporation by While asking about the dumping of waste people hardly know where it goes after transportation very few are aware of landfill sites. Most of the people dump their garbage on any vacant place such as field, plot, near road etc. PMC data says there is only one dumping site in Patna Biraiya Dumping site. This is also not a proper landfill sanitary dumping site. Dumping again creates many environmental issues.

People’s Perceptions of Swachh Bharat Mission on Solid Waste Management

Solid waste management is one of the components of the Swachh Bharat Mission. According to respondent answers people are aware of Swachh Bharat Mission they have seen it on the 2nd October 2014 when they took initiatives to cleaning the cities they said many local Politicians were seen on Television cleaning the road, many children, Bank officials, other institutions were took initiatives in Swachh Bharat Mission. But they also agree that was not intentionally most

of the people were clicking the photographs rather than cleaning or taking pledge to keep clean the cities.



(Source: Primary Data, 2016-17)
Figure 6: Role of Swachh Bharat Mission

(A)Awareness of cleanliness in Danapur, (B) clean road and Dustbin availability at Khagaul bus Stand, (C) Dustbin at common waste collection point at khagaul (left to right).

Research says in some places like Golghar where Door to Door collection of waste started properly every morning. But other places like Khagaul still no provision of door to door collection of waste, people throw it near the road or vacant place. Research says after the Swachh Bharat Mission number of dustbin has increased as it could have seen near the bus stop or near the Road everywhere which were not earlier the Swachh Bharat Mission. Many places to spared awareness of cleanliness many campaign has done by NGOs and Institutions. Children and youngsters are much aware about the Swachh Bharat Mission as compare to other age group.

Road sweeping frequency increased by Patna municipal workers after the Swachh Bharat Mission. When questions were asked about the spiritual garbage means after the traditional rituals and worshipping of God residues, 100 percent of the people said that they throw in the river Ganga or nearby the Ghats of Patna. They were very strict about their beliefs they don’t throw in dustbin all the spiritual residue as they commented “Bhagwankakachrakudedan mafenkege to humko pap chadhenga” (If i throw spiritual residue into the dustbin I will get cursed). That is the reasons all Ghats of patna are piled up with all spiritual garbage which is threat to wetland ecosystem.

People’s Behaviour and Attitude towards Cleanliness

While doing Participatory observation method research found that people are very insensitive (fig.7) to keep the society clean research found 96 per cent of people are fond of eating Pan and it could have seen from the colour of their tooth and lips and spitting all over the road, this litter road the most. Many people eat anything and throw the rapper on the way. While asking about this behaviour they don’t feel ashamed and arrogantly started arguing. But some of them accepted that lack of dustbin is the reason to throwing rappers on the way that was a valid reason but if people would have been sensitive they can keep the rapper along with themselves and could throw at the right place.

The major reasons were the laziness and unwillingness of people creates the city dirty. Very few street food shopkeepers keep dustbin along the shop, which again creates garbage in the market people throw all over the street after eating and litter the market. In the rail people eat nuts, orange and other things and throw in the floor of train and litter the train. In the season of festivals like Durga Pooja Saraswati Poojaand Chhatpooja people enjoy a lot, but after the

celebration they left the city very unclean, this time many garbage biodegradable and plastic waste generate in the city.



(Source: Primary Data, 2016-17)

Figure 7: People behaviour towards cleanliness

Role of Gender in Waste Management and Cleanliness

Gender plays a vital role in Waste management and cleanliness research found while participatory observations that rag picker were mostly male very few female rag picker found in the study area. Rag picker constitute a segment of the people involved in the waste trade make a living by collecting and selling recyclable materials out of Municipal solid waste [8]. At the time of interview which was done in every class of society. In wealthy people who keep home worker for cleanliness when it was asked whom they prefer as a worker most of them said that the women they prefer for cleanliness. Since many years ago female workers are cleaning their houses and manage the solid waste and other household chores also done by the female member of the house. When it was asked from other low income group, they said all the cleanliness is done by the daughter or daughter in law of the house, no male person take initiatives for cleanliness. Some of male person and the old age group lady said that “Mera beta ghar saaf kyu kare Bahu kis liye hai fir” (Why should My son will clean the house, if I have daughter in law) and other comment was” ye ghar shaf karna ladkiyo ka kam hai”(cleanliness is work of girls). These comments shows that the status of women in their houses in study areas.

These comments also show the mentality of the people about the female and discrimination between male and female in the house. Research found that most of the PMC workers were male in the study area, very few female municipal workers worked there. There is contradictory in gender in cleanliness, research say participation of female worker in PMC is very less and in other side participation of male as home maid is very less. It could be because of the safety issues and the orthodox mentality of people hampering female to participate in open space as municipal worker. This research shows gender discrimination at work place. It is very difficult to reach and fulfil the demand of Swachh Bharat Mission and Solid Waste Management without the participation of male person in cleanliness as the sex ratio of Patna which is 897 per 1000 males, which is below than India sex ratio. Without the equal participation of gender cleanliness is not possible.

Conclusion

The quantity of municipal waste, solid waste generated is increasing rapidly due to increasing population and changing and lifestyle . Now people are more inclined to westernisation. Market is also filled with packed food semi cooked food and youngster are used to eat lots of junk food items which come in big colourful packets. As

people are getting smarter and using lots of technology and every month and a year new gadgets are launching and people are fond of using new phones, ipad, laptop and throwing the old one there is no provision of 4R(Reduce, Reuse, Recycle, Resource recovery) methods. People are not reducing the waste they don't recycle the waste they don't reuse the materials, and there is no provision of waste recovery at any stage of Solid Waste Management.

E- Waste another solid waste problem of Patna. Lifestyle has change and market are converted into the online market, most of the people buy goods from online to save money and time, but in online shopping goods comes, in very good packing by using lots of plastic air filled bags and many carton, which is not useful for the people and all residue become waste. This is going to lead the main waste generation source in the future. The Swachh Bharat Mission has made an impact on the study area respondents has said that the number of dustbin has increased after the Swachh Bharat initiatives but that too is insufficient for the people of Patna. Schools are helping in spreading the awareness still most of the people are unaware of cleanliness and benefits of cleanliness.

The behaviour of the people of in Patna they are insensitive in nature, they hardly care about the street cleaning research found many people who eats pan and spit all over the street. Overall the municipal Solid Waste Management faces the main problem at the time of collection and transportation of waste very few municipal persons collect waste door to door and waste transported by different vehicles like hand cart, JCB, Truck which is also not follow the guidelines of Municipal Solid Waste Management and Handling Rules [9]. People of Patna have said that garbage trucks are uncovered so many times the garbage are spread on the roads while transporting. After the Swachh Bharat Mission initiated in the Patna some of the street wall has written quotations like ‘yaha kuda na feke warna 500 zurmana lagega’. But ironically many few people follow the statements. Overall all research can say very negligible impact of the Swachh Bharat Mission in patna on both institutional level as well as people participation level.

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