A Situational Analysis of Solid Waste Management in Jabalpur Municipal Corporation Under UDAY in Madhya Pradesh

*** Ajit Kumar Mishra**

Abstract

Madhya Pradesh is one of the largest states in India - Second largest in area and sixth in terms of population. The state faces unprecedented urban challenges. Solid Waste management is one among them. Several packages were awarded in this the field of solid waste management in Jabalpur with the support of ADB. Huge sums of funds have been invested under different scheme on solid waste management. The present study in about solid waste management in Jabalpur city. The study in order that the waste management in become the satisfactory level.

Keywords: *Solid Waste, Infrastructure, Economic development*

Introduction

Madhya Pradesh is the second largest state by area and sixth largest state by population. Its capital is Bhopal and Indore is the largest city. It borders the states of Uttar Pradesh, Chhattisgarh, Maharashtra, Gujarat and Rajasthan. Madhya Pradesh in Hindi can be translated to Central Province, and it is located in the geographic heart of India. The state straddles the Narmada River, which runs east and west between the Vindhya and Satpura ranges; these ranges and the Narmada are the traditional boundaries between the north and south of India. The state is bordered on the west by Gujarat, on the northwest by Rajasthan, on the northeast by Uttar Pradesh, on the east by Chhattisgarh, and on the south by Maharashtra. The Madhya Pradesh is a State in Central India and known as "Heart of India" due to its geographical location in the country. The state is considered as second largest state in the country due to its area. With over 72.6 million inhabitants, it is the sixth largest state in India by population. It boarders the states of Uttar Pradesh to the northeast, Chhattisgarh

***** *Assistant Director, RCUES, Lucknow*

to the southeast, Maharashtra to the south, Gujarat to the west and Rajasthan to the North West, Geographically, the state covers 32 Urban Agglomerations Constituents with a population above 100,000 (Census 2011) including the capital city Bhopal. The total urban population is currently 20 Million (Total 20,059, 666: Male 10,470,511: female 9,589,155) as per census 2011 or 27.6 percent of total population (Male 27.8 percent: female 27.4 percent). The urban area recorded a population growth from 13,29,445 in 1901 to 20,059,666 in 2011 which is much higher than that observed in the rural areas (11,349,769 in 1901 to 52,537,899 in 2011).

The urban Madhya Pradesh has 378 Urban Local Bodies(ULBs) comprising 16 Municipal Corporations, 98 Municipal Councils and 264 Nagar Parishads. On the basis of the size of urban population in the country, Madhya Pradesh ranks 8th and accounts for 5.58 per cent of the total urban population. It poses 20.1 million (27.7 percent) urban populations and following the national trajectory of urbanization closely. However, it faces unprecedented urban challenges and water supply is the most pressing one. The Table given below, briefly summaries water supply condition in urban local bodies of MP.

The Table also provides demographic distribution of urban population in various categories of urban local bodies of the Madhya Pradesh.

Table No. 01 : Urban Population of URBAN Local Bodies of The Madhya Pradesh.

Snapshot of Economic and Infrastructural improvement in Madhya Pradesh

Economy of Madhya Pradesh was considered as one of the most "Sick" economies of India till 2003, after 2005 it registered consistent growth rate and it reached "INDIA'S TOP MOST STATE" in terms of GDP growth, with 10.2 percent GDP for annual year 2011-12. Madhya Pradesh has received award from Hon'ble President of India - *Shri Pranab Mukharjee*, in January 2013 for its Tourism, Medical and Infrastructural growth. At present, after Gujarat, Madhya Pradesh is the second preferred state for corporate world to get their industries set up.

a) Economic Growth (India Brand Equity Foundation 2013):

- At current price level, the Gross State Domestic Product of Madhya Pradesh for 2011-12 is recorded at US$ 65.7 billion
- The annual Gross State Domestic Product of MP is recoded at 14.7 percent between 2004-05 and 2011 -12.
- The average NSDP growth rate is recorded at 14.9 percent between 2004-05 and 2011-12.
- The State's per capita GSDP in 2011-12 was US$ 902.6 as compared to US $ 388.1 in 2004-05
- Per capita GSDP has increased at a Compound Annual Growth Rate of 12.8 percent between 2005-05 and 2011-12.
- The State's per capita NSDP in 2011-12 was US$ 806.6 as compared to US$ 343.5 in 2004-05.
- The per capita NSDP increased at an average rate of 12.9 percent between 2004-05 and 2011-12

b) Drinking water and Sanitation:

In MP, 1943424 households (total urban households 3845232)are getting tap water from treated source, 447698 from untreated source, 49371 from covered well, 160643 from uncovered well, 562072 from hand pump, 588975 from tube well, 2211 from spring, 5087 from river/canal, 28576 from tank /pond/lake and 56675 from other sources in urban area **(**Vikas Samvad (2013).

In urban area, 2854081 households (out of total households in urban area 3845232) are having toilet facility within premises. Out of the total, 2750877 households are have flush latrine connected to piped sewer system (775253 households), septic tank (1927886 households), and other system (47,738 households) while 63842 have pit latrine with ventilated improved pit (47068 households) and without slab/open pit (16774 households).

c) Poverty

As per Tendulkar methodology 48.6 percent (Rural 53.6 percent Urban 35.1 percent) of the total stand population below poverty line in 2004-05 which is reduced to 36.7 percent (Rural 42 percent; Urban 22.9 percent) in 2009-10

d) Health Infrastructure and services:

The State has 50 district hospitals, 332 Community Health centres, 1156 Primary health centres, 8761 Sub centres, 28 Ayurvedic hospitals, 2 Unani Hospitals, 20 homeopathic hospitals, Improvement in Birth Rate 26.9 (Rural 28.8 Urban 20.1), Death Rate 8.2 (Rural 8.7 Urban 6.1) infant mortality rate 59 (Rural 63 Urban 39) is recorded as compared to 2005 - Birth Rate 30.2 (Rural 32.1 Urban 22.5), Death Rate 9.8 (Rural 10.4 Urban 7.1) and Infant Mortality Rate 82 (Rural 86; Urban 55) (SRS -April 2005 and October 2012)

Jabalpur is one of the cities that benefitted under UWSEIP with the support of ADB during 2005 - 2013. It is the third largest urban agglomeration in Madhya Pradesh and 40th largest urban agglomeration in India as per the 2011 census statistics. Its old name was thought to be Jabalipuram but, in actuality, it was Jubbulgarh. It was later changed to Jubbulpore during British Governance and is now simplified as Jabalpur. Historically, a center of the Kalchuri and Gond dynasties, Jabalpur developed a syncretic culture influenced by the intermittent reigns of the Mughal and Maratha. In the early nineteenth century, it was gradually annexed inBritish India as Jubbulpore and incorporated as a major cantonment

town. After the Independence of India, there have been demands for a separate state of Mahakoshal with Jabalpur as its capital.

Jabalpur is known for its picturesque marble rock formations (Bhedaghat) on the banks of the river Narmada. Because it is the army headquarters of five states (Madhya Pradesh, Chhattisgarh, Odisha, Bihar and Jharkhand), one sixth of the city is occupied by the Ministry of Defence. Several important federal and state institutions are located in Jabalpur, including four Universities (RDU, JNAU, GMU and NDVU), the premier technology institute and the oldest in central India, the JEC and the IIIT.

It is bordered by Katni to the north, Umaria to the north-east, Dindori to the east, Mandla to the south-east, Seoni to the south, Narsimhapur to the south-west and Damoh to the north-west. Jabalpur is the administrative headquarters of both the Jabalpur district (the second most populous district of Madhya Pradesh) and the Jabalpur division.

Jabalpur has total population 2,460,714 of which 1,438,777 (58.46 percent of total population) population reside in urban area. It has third highest rank in terms of size of urban population (1,438,777), followed by Indore (2,424,132) and Bhopal (1,914,339). Average literacy rate of Jabalpur city is recorded at 88.90 percent of which male and female literacy was 92.65 and 84.88 percent. The sex ratio is recorded 929 per 1000 males in the city which is highest as compared to the figures at Jabalpur district (908) and Madhya Pradesh (919) as per the Economics and Statistics Directorate of Madhya Pradesh (2012).

Accomplishments under UWSEIP in Jabalpur:

Following packages were awarded in the field of solid waste management with the support of ADB to improve infrastructure and services of Municipal Corporation in the city:

Solid Waste Management

1. Development of Sanitary Landfill Sites at Kathonda in Jabalpur- **JBP/SWM/04**
2. Development of New Landfill Site at Kathonda Jabalpur- **JBP/SWM/07**

3. Procurement of equipment for solid waste management-supply and delivery Bulldozer- **JBP/SWM/06-Lot-01**
4. Procurement of equipment for solid waste management-supply and delivery Backhoe Loader- **JBP/SWM/06-Lot-02**
5. Procurement of equipment for solid waste management-supply and delivery of medium size chain mounted hydraulic excavator- **JBP/SWM/06-Lot-03**
6. Procurement of equipment for solid waste management-supply and delivery of no. 2 Dumper tipper - **JBP/SWM/06-Lot-04**

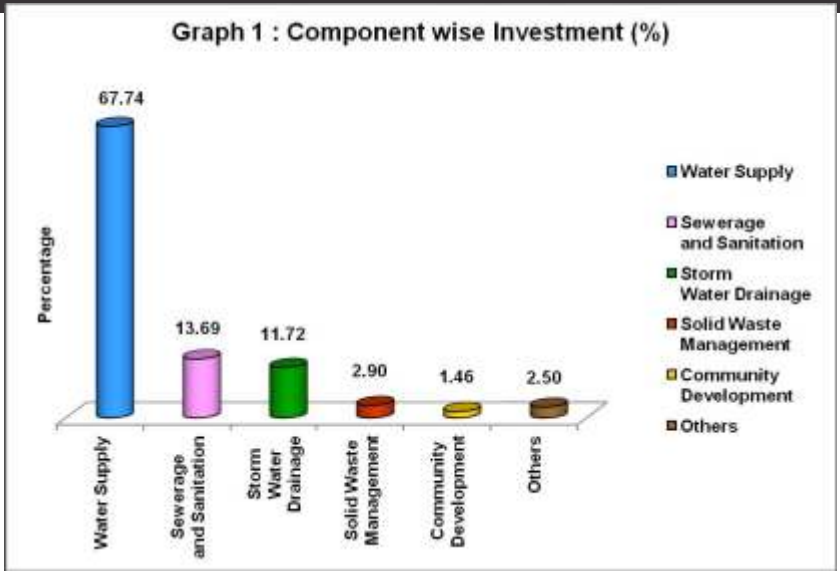
Magnitude of Investment:

As on November 2013, the total investment made (loan 2046 and 2456) being ? 135703.15 lakh to establish infrastructure and municipal services in four cities of the State. The investments were made in five components of the project i.e Urban Water Supply, Sewerage and Sanitation, Storm Water Drainage, Solid waste management and Community Development (AIF/CIF). Besides, management cost was incurred for better planning and management of the project. The details of the investments made under different components for four cities of MP are as follows:

Table No. 2 : Investments Details in UWSEIP

In Jabalpur, ₹ 26926.43 was committed to achieve objectives of the project. The maximum amount was invested in the city to improve water supply system {18240.76 (67.74 percent)}, followed by sewerage and sanitation {3686.17 (13.69 percent)}, solid waste management {782.15(2.90 percent)}, storm water drainage {3152.23 (11.71 percent)}, community development {394.10 (1.50 percent)} and other expenses {671.02 (2.49 percent)}.

Table No. 3 : Investments Details in Jabalpur Municipal Corporation under UWSEIP



Objectives:

The objectives, of the prevent study, are:

1. To identify the changes in the quantity and quality of the delivery of services.
2. To identify the changes in environmental conditions which may have occurred
3. To assess the impact of these changes ; and
4. To assess the public perception of these changes.

Methodology:

A field survey has been conducted with the help structured interview schedules for beneficiaries, concerned officials and non officials. The following methodology was used to conduct evaluation of the data.

Sample Size: The evaluation was expected to cover 2 percent of the total households of the city as respondents.

Sampling technique:

Sampling is concerned with the selection of a sub set of individuals within a statistical population to estimate characteristics of the total population. Households were selected by using Simple Random Sampling Technique. Simple Random Sampling Technique is considered as highly representative and minimizes bias in the selection of respondents. A list of households residing in the ward was collected from the ward office and accordingly units were selected to be interviewed by using structured schedule.

Evaluation Tools:

Keeping in view the objectives of the study, evaluation tools consisting of both structured schedule and checklists were designed to be used to collect data from each stakeholder of the Municipal Corporation secondary data also gathered from different Government and Non-Government publications.

Solid Waste Management - An analysis

Solid waste has been defined as unwanted solid materials generated from combined residential, industrial, and commercial activities in

the city. It may be categorized according to its origin, contents or hazard potential. Management of solid waste reduces adverse impact on the environment and human health and further contributes in improving quality of life of people ultimately leading the development of the economy.

Solid waste management is an obligatory function of the Municipal Corporation. In Jabalpur, the primary sources of solid waste are households, commercial establishments, hotels, restaurants and hospitals. The JMC (Jabalpur Municipal Corporation) is responsible for collection, transportation and disposal of all solid waste generated in the city except the untreated bio-medical waste and hazardous industrial waste, the disposal of which is the responsibility of respective generators. Presently, city is generating 450T per day solid waste from various localities. In order to manage waste, the JMC has a provision of waste collection points at different locations. The waste has been collected from waste collection points and transported through a team of its own conservancy functionaries with the support of equipment.

In 2005, city was generating 380T/day of solid waste, of which only 50 to 60 percent waste was lifted for disposal at Ranital dumping ground and Lema Garden due to limited resources. The capacity of the designated sites (Ranital and Lema) were already full at the beginning of the project. Therefore, a new site was decided to be developed at Kathonda which is located in the outskirts of the city. To begin with, equipment like waste collection containers, dumper placer vehicles, chain mounted hydraulic excavator, and loader backhoe, mechanical road sweeper etc. were procured. Subsequently, waste collection system was improved and a landfill site is now constructed for disposal and treatment. The Table No – 4 shows the achievement of the solid waste management under the project.

Table No. 4: Status of Existing Infrastructure at Different Stages of the Project Period

Packages implemented under the Solid Waste Management component are mainly divided into two categories: a) procurement of equipment; and b) civil works including development of landfill site/landfill cells. Equipment were procured centrally by the PMU and have been supplied to the Jabalpur Municipal Corporation. Trained people were hired on contract basis by the JMC to use newly received equipment. Thus received equipment have been fully utilized. According to Mr. Nema (Incharge of handling equipment from Health Department of MC) "availability of equipment has improved our quality of the work and efficiency as well. Earlier waste collection and disposal were being managed with the support of laborers manually (locally available equipment), which was time consuming. Alongside, it was difficult to complete work on time with certain level of quality". The repair and maintenance of the equipment are time consuming due to non-availability of service

centres in the city. In the case of non-functionality of equipment, mechanics have to be called from the Nagpur for its repair and maintenance and they take more than a month, particularly in case of non-availability of a particular spare part of the machine.


Solid Waste Collection Vehicle

The construction of sanitary landfill site has been completed but not as envisaged under the project. At present, site has been used for dumping the waste. It has already reached up to its maximum capacity due to inadequate operational system. There is a need to make it fully operational by establishing systems like availability of weighbridge, developing road network on working front, compacting of waste, wheel cleaning facility etc. There was a challenge faced in the land acquisition and the rehabilitation of eight illegal dwellers during project implementation. In brief, land was approved by the department to develop as a landfill site and eight families were shifted to a village Rimjha located at a distance of about 2 to 2.5 kms from the original site. As this was a special case of rehabilitation and resettlement under the project, the BMEC team discussed with some of the families to understand the rehabilitation need and the benefits to the households at the implementation stage of the project (MTR 2009). The beneficiaries, stated that they were benefitted with the legal entitlement as land holder, and gained monetary compensation as per ADB norms, provision of basic amenities (like water supply, electricity, roads, etc), skill development, control over haphazard disposal of solid waste at any location and scientific disposal of household waste.

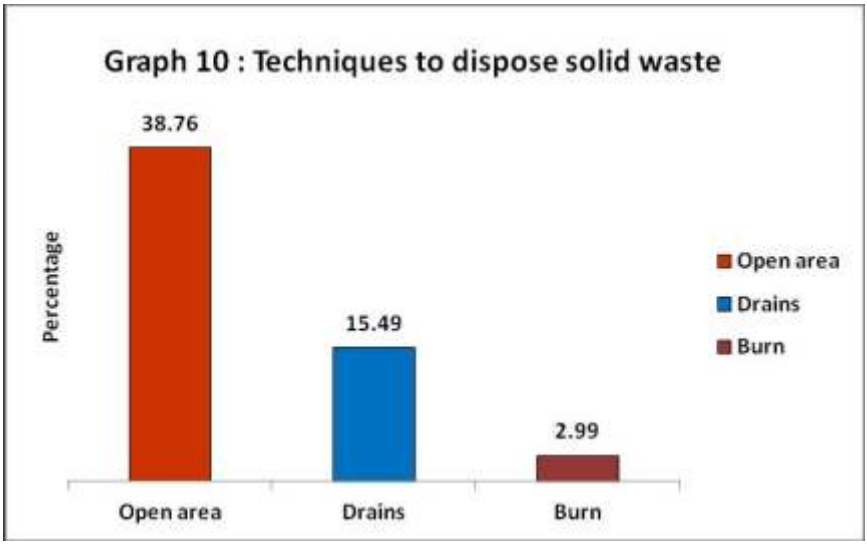
Solid waste collection system: The process of waste collection and management varies from locality to locality. In general, five types of garbage disposal systems are reported by the Households. These systems are: door to door collection, use of municipal dustbins, waste lying in open place/informal collection points, dumping of solid door

Door to Door collection of waste, Billahri

waste directly into the open drains and burning of solid waste. Door to door collection and use of common dustbins supplied by the municipal corporation are safe and good methods to be practised from the point of view of safe environment and prevention from diseases. Survey data indicate that 36 percent Households have the facility to door collection of solid waste and 15 percent Households use common dustbins to dispose solid waste. Comparison with baseline data reveals that door to door collection of waste has improved from 6 percent to 36 percent during the project period. Around 50 percent Households use different techniques to dispose their waste. Like 38.76 percent Households dispose their waste in open area, 15.49 percent throw in drains and remaining 2.99 percent burn waste. These data clearly indicates that improper practices are continued for solid waste disposal in the city which needs attention.

Table No. 5 : Solid Waste Management System

Source: *Final evaluation conducted by BMEC, 2013*



Sustenance of the solid waste management:

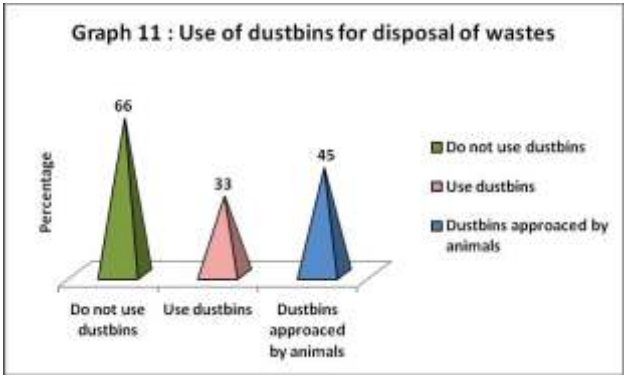
With regard to payment for door to door collection of solid waste, only 11.96 percent Households (of 1095 Households) reported that they are spending on an average Rs. 22 per month on door to door collection of waste. At the same time, 18.98 percent Households reported that they are willing to pay around Rs. 28 per month for better services of waste collection.

Table No. 6 : Pay For Door To Door Collection of Waste

Source: *Final evaluation conducted by BMEC, 2013*

Types of garbage and segregation system

Awareness regarding importance of segregation of bio-degradable and non-bio-degradable waste at home is important to save time and energy to segregate waste at later stage for recycling and reuse. The findings of the survey indicate that about 59 percent Households are aware of the segregation system and 40.64 percent Households still lack knowledge in this regard. Even though awareness among people has improved during the project period with regard to segregation system (baseline 39.85percent) still adequate attention is required.



In practice, only 10 percent Households segregate their waste although they are aware of the segregation system. This needs to be improved.

Table No.7: Households Level Awareness about Segregation of Waste

***Source**: Final evaluation conducted by BMEC, 2013*

Distance of dust bin and its usage system

Proper waste collection system requires uniform distribution of dustbins at the localities. It is important to have accessibility of dustbins to a minimum distance for its optimum utilisation. In this connection, 15 percent Households of those who have the facility of dustbins, 9.71 percent reported about the availability of dustbins at a distance of 51 meters from their houses and they are using the same while others are either not aware or not using the existing facility.

Table No. 8 : Distance of Collection Bins

Source: *Final evaluation conducted by BMEC, 2013*

Table No. 9 : Participation in consultations to decide place for

Source: *Final evaluation conducted by BMEC, 2013*

Frequency of clearance

When enquired about the frequency of garbage collection by municipal staff from their localities, only 32 percent Households reported about daily collection of waste while others report other options such as alternate days (3.52 percent), once in a week (46.63 percent), twice in a week (12.07 percent), and thrice in a week (5.20 percent).

Data indicates the improvement in daily collection of waste (baseline 8.3 percent and end line 32 percent). But still there is scope for improvement.

Table No. 10 : Frequency of Waste Disposal

Source: *Final evaluation conducted by BMEC, 2013*

With regard to use of dustbin by the Households for disposal of waste, around 66 percent Households reported that they do not use dustbins while only 33 percent reported use of dustbins. Nearly 33 percent Households find that their dustbins are approachable by the animals which is dangerous for animals and environment. However, there is a need to aware people to use dustbins to avoid any harm to the animals. In order to avoid unhygienic conditions around the waste bins it is important to have such type of bins which are away from animal reach.

Table No. 11 : Use of Bins

Source: *Final evaluation conducted by BMEC, 2013*

Level of satisfaction:

The survey indicates that the Household respondents are not satisfied with the present level of municipal services, regarding the solid waste management. Their percentage is nearly 70 percent as much the present level of municipal services regarding the solid waste management system. As mentioned earlier, this requires capacity enhancement of municipal services so that environmental quality in the residential localities improves.

Table No .12 : Level of Satisfaction

Source: *Final evaluation conducted by BMEC, 2013*

Table No. 13: Level of Satisfaction from Waste Collection and Disposal System

Source: *Final evaluation conducted by BMEC, 2013*

Public opinion about improvement of the system due to UWSEIP:

Only 22 percent Households perceived that solid waste management system has improved in the city due to implementation of UWSEIP.

Table No. 14 : Improvement in Solid Waste Management System due to Implementation of Project UDAYY

Source: *Final evaluation conducted by BMEC, 2013*

Conclusion and Recommendations

Even though the status of solid waste management system has improved from the baseline on various parameters such as door to door collection of garbage (baseline 6 percent; end line 36 percent), reduction in disposal of waste in open area (baseline 76 percent; end line 37 percent), segregation system of biodegradable waste and non biodegradable waste (baseline 39.85 percent; end line 59.13 percent), daily collection of waste (baseline 8.3 percent; end line 32.58 percent) but it still needs improvement to a great extent. The reasons of improvement may be seen due to the availability of equipment supplied under the project. As mentioned by the Health Officer (officer responsible for handling and management of the equipment) that working efficiency of the municipal staff has improved due to availability of modern equipment as previously this work was being managed with the help of labourers manually. Officer also felt the need to procure adequate number of equipments to increase the coverage, faster collection of waste from different parts of the city and proper management of solid waste in future. It is important to make the community aware of their responsibility of handling the waste at the primary level due to lack of knowledge about waste segregation system and its practice. This calls for need based design and implementation of awareness programmes in the entire city by using various techniques such as campaigns, publication in the news papers/magazines, use of local media including TV, radio, and audio-visual shows, display of posters, organizing exhibitions, etc. In this respect, health officer has a plan to conduct a pilot for door to door collection of waste in two wards i.e. Dayanand Sarswati Ward and Subhadra Kumari Chouhan. Plan also includes the awareness campaign to sensitize people and improve their knowledge about segregation of waste in two separate bins and its disposal mechanism. Besides, community consultations need to be increased so that the garbage is properly managed by the people. In nutshell, there is a need to make the city livable by making waste collection and disposal system more efficient. This calls for improvement in the methods of garbage collection and disposal with sufficient number of equipment.

A number of measures have been suggested to make the solid waste management more efficient:

(a) Procurement of more number of equipments which should be supported by the availability of trained personnel to use the available equipments along with the facility of service centre in case of its becoming nonfunctional.

(b) Regular monitoring of solid waste collection and its disposal status in all parts of the city including market places by using different techniques like observation through physical presence in wards, interaction with community members, conducting review meeting with the staff responsible for its management and tracking use of equipment.

© Organize awareness programme to improve community knowledge about existing system of solid waste collection and its disposal along with its benefits. In view of low level of knowledge and practice at Households about segregation of waste and available facility, it is important to make the Households realize the need for segregation of wastes.

(d) Encouragement of CBOs/NGOs to play an active role in inculcating civic sense in the minds of the Households. These agencies can also act as a vigilance group in identifying and reporting the cases of non -clearance of the solid waste.

(e) Nominal charges for regular waste collection from the common bins of residential areas should be encouraged except from slums. In case of commercial consumers like hotels, wholesale markets, hospitals appropriate fees may be considered after a consultation with them.

References:

ADB(2005) Project Administration Memorandum Project UDAY, Madhya Pradesh

Census India (2011) "Urban Agglomerations/Cities having population 1 lakh and above". The Registrar General & Census Commissioner, India. Retrieved 18 October 2011.

Government of India(2011) Census of India .

Government of India(2011) Census of India Provisional Population Totals

India Brand Equity Foundation (2013): Madhya Pradesh-the land of diamonds, www.ibef.org

IPE(2013) Benefit Monitoring and Evaluation Report on Project UDAY, Bhopal

Sankhyaki Sankshep (2012) : Economic and Statistical Department of Government of Madhya Pradesh.

SRS Bulletin (2005) : Sample Registration Survey, Registrar General , India Volume 39, No 1

SRS Bulletin (2012) : Sample Registration Survey, Registrar General , India Volume 47, No 2

Vikas Samvad (2013): Profile series, www. censusindia.gov.in/2011 census/hlo/district_tables/23/HH2206 2300CRCD.**1**