

“Mapping Water Supply and Sanitation Services of Urban Local Bodies with Health of the Urban Poor: A Case Study of Bhopal City”

Dr. Nupur Rao,

Professor,

Sagar Group of Institutions, Bhopal.

Abstract:

Urban local government institutions/municipalities are constituted for the maintenance and planned development of urban areas. The objective is to ensure that suitable levels of infrastructure and services are available to the citizens.

It is estimated that 67% of total population growth in India, in next 25 years, is expected to take place in urban areas. Urban population is expected to increase from 286 million in 2001 to 534 million in 2026 (38%).

The by-products of urbanization have not always been positive. 20 percent of the country's urban households are denied access to safe drinking water, 58 percent do not have safe sanitation, and more than 40 percent of garbage generated is left uncollected for want of proper waste management. The proportion of households with water source within their premises among slum households is lower (57%) compared to 71% for overall urban India (Census, 2011). Moreover nearly 70% of households depend on some form of shared facilities.

In many parts of India, the quality of life in urban areas is miserable and the citizens lead a difficult life. About one fourth (24%) of the urban population or 67 million persons are poor i.e. their expenditure on consumption goods is less than Rs. 454 per month. In Madhya Pradesh, nearly 40% of the urban population, comprising 6 million people live below poverty line. In such circumstances, when infrastructure and services are lacking, urban settlements are amongst the world's most life threatening environments.

The urban poor suffer from adverse health outcomes which do not get reflected in commonly available health statistics as rural and urban aggregates mask the inequalities which exist within the various economic groups in rural and urban areas.

For instance, the under 5 mortality rates (U5MR) among the urban poor (112.2) are nearly three times higher than the rates for the urban high income groups (39.4). As per the second round of the National Family Health Survey (NFHS 2) conducted in 1998-99, only 43% urban poor children are fully immunized by completion of one year of age. The percentage of severely underweight children among the urban poor is 23 which is approximately twice the urban average (11.6%) and 5 times (4.5%) that of urban high income group.

The urban poor are vulnerable to health risks because of living in a degraded environment, inadequate health services, poverty and lack of negotiating capacity to demand better services.

All the basic amenities of life - drinking water supply, sanitation/sewerage, solid waste collection, primary education, primary health, municipal roads, street lighting, traffic regulation etc. are provided by the urban local bodies. Amongst these water and sanitation are the most vital ones. Accesses to safe water and to sanitary means of excreta disposal are basic human rights and form an indispensable component of primary health care. Safe drinking water and improved sanitation play a major role in the overall well being of the people with a significant bearing on the IMR, death rate, longevity and productivity.

With reference to the series of reforms undertaken by the government, the present research work mainly tries to *map Water Supply and Sanitation Services of BMC with Health of Urban Poor*. For the purpose of the study, Bhopal town of Madhya Pradesh was chosen as the universe. It includes all the stakeholders of Bhopal Municipal Corporation i.e. the officers, public representatives, field employees and the customers. A stratified random sampling was used to select the sample from the population.

The research work has mainly relied on primary and secondary data for the analysis. The primary data is collected through structured interview schedule prepared by the researcher and also with face-to-face dialogue with the respondents. The secondary data particularly the historical data is also collected from the various

sources e.g. Annual Budget document, Policy documents, Journals, Reports, Magazines, Newspapers, Books, BMC's website, Government Publications and Pamphlets and Brochures.

1. Introduction

Water Supply is a State Subject as per Article 246 of the Constitution (Item 17 of the State List under 7th Schedule). Govt. of India formulates policy guidelines, provides financial and technical assistance and facilitates mobilization of external assistance. States/Urban Local Bodies (ULBs) are responsible for planning, designing, implementation and operation & maintenance of water services. India being the second largest urban system globally, speaks about the pace of urbanization in India.

Status of Basic Services:

Water Supply: As per 54th round of National Sample Survey, 70% of urban households reported are served by tap and 21% by Tube well or hand pump. 66% of urban households reported, had their principal source of water within their premises while 32% had it within 0.2 Km. 41% had sole access to their principal source of drinking water and 59% were sharing a public source. Based on an ADB Study on benchmarking of water utilities in India, it is estimated that the duration of water supply in cities varies significantly. For instance Chandigarh receives a supply of 12 hours per day as against Rajkot which has a supply of 20 minutes per day. No city had a 24×7 water supply.

Sewerage: 54th round of NSS reported that 26% of households had no latrines, 35% were using septic tank and 22% were using sewerage system. Sewerage connections varied from 48% to 70%. According to Central Pollution Control Board, the waste water generated in 300 Class I cities is estimated at about 15800 Million litres a day while the treatment facilities exist for hardly 3750 million litres per day. (as per population in 2001 census).

Three broad institutional frameworks are discernible in states in India with regard to water supply and sewerage services. First are the states where the entire system is with a department or a parastatal of the State Government; second, where the ULBs themselves handle the entire activity and, third, as in some large cities, where exclusive water supply and sewerage boards have been set up for the city (Annexure1)

2. Emerging Challenges in Water and Sanitation Service Delivery

Irrespective of the institutional framework, the failure of the public sector to provide adequate service delivery have been ascribed to public monopoly, organizational inefficiency, technical flaws in the form of high leakages, lack of preventive maintenance, unaccounted water as well as over staffing and lack of autonomy. City planning function has not been handed over to ULBs in many states. These state level organizations are often not accountable to ULBs. Though 74th CAA expects that major civic functions should be transferred to ULBs many small and medium sized ULBs are not in position to manage water supply, sanitation and town planning functions.

The coverage of urban population with water supply facilities in the past had not been very impressive, due to various reasons, including the fact that the investment made in the urban water supply sector had been inadequate. The Investments made so far have been small (Annexure 2) and were geared more towards infrastructure without addressing service delivery & improvement.

Distorted Investment & Lack of Accountability is another reason for the failure. It has been seen that Utilities are not maintaining their assets or focusing on service quality or sustainability. There are inadequate financial resources due to low / no tariffs and limited central / state support, high costs due to operational inefficiencies and lack of autonomy. They are focused on obtaining grants for investment rather than on service provision for which they are not held accountable.

3. Factors affecting Health of the Urban Poor

Water and sanitation diseases are responsible for 60% of the environmental health burden. The single major cause of this burden of disease is diarrhoea, which disproportionately affects the children under the age of five.

Water-washed diseases are prevalent in areas with inadequate water supplies for people to keep their hands, bodies and environments clean. Diarrhoea diseases, as well as skin and eye infections, are easily spread under these conditions. Water-borne disease transmission occurs through the consumption of contaminated water, and can affect those illnesses transmitted by the Faecal-oral route, including diarrhoea.

Murray and Lopez calculated that in 1990, 5.3 % of all deaths and 6.8% of all DALYs lost are associated with diarrhoea and selected parasitic infections, stemming from inadequate access to water and sanitation (Annexure 3). Annually, there are around 2.4 million deaths related to water and sanitation mainly resulting from diarrhoea diseases and occurring mostly among children under 5 (Annexure 4). Improving the quantity and the quality of water available, providing adequate sanitation facilities and adopting better hygienic practices interrupt the transmission of most faecal-oral disease.

Health and nutrition are other important factors affecting employability. Poor nutrition, polluted water and air etc. lead to poor health, which impairs labour productivity and, thus employability.

In extreme cases, not only poor health, but also poor nutrition will effectively prevent participation in the labour force. Above all, health needs to play a more important role in considerations regarding employment conditions and the development of the regional economy.

4. Relationship between Water, Sanitation, Hygiene and Health

Water supply, sanitation and health are closely related. Poor hygiene, inadequate quantities and quality of drinking water and lack of sanitation facilities cause millions of the world's poorest people to die from preventable diseases each year. Women and children are the main victims.

Water, sanitation and health are linked in many ways:

- Contaminated water that is consumed may result in water-borne diseases including viral hepatitis, typhoid, cholera, dysentery and other diseases that cause diarrhoea.
- Without adequate quantities of water for personal hygiene, skin and eye infections (trachoma) spread easily.
- Water-based diseases and water-related vector-borne diseases can result from water supply projects (including dams and irrigation structures) that inadvertently provide habitats for mosquitoes and snails that are intermediate hosts of parasites that cause malaria, schistosomiasis, lymphatic filariasis, onchocerciasis and Japanese encephalitis
- Drinking water supplies that contain high amounts of certain chemicals (like arsenic and nitrates) can cause serious diseases.

Inadequate water, sanitation and hygiene account for a large part of the burden of illness and death in developing countries:

- Approximately 4 billion cases of diarrhea per year cause 2.2 million deaths, most-1.7 million-children under the age of five, about 15% of all under 5 deaths in developing countries.
- Diarrhoeal diseases account for 4.3% of the total global disease burden (62.5 million daily). An estimated 88% of this burden is attributable to unsafe drinking water supply, inadequate sanitation, and poor hygiene. These risk factors are second, after malnutrition, in contributing to the global burden of disease.

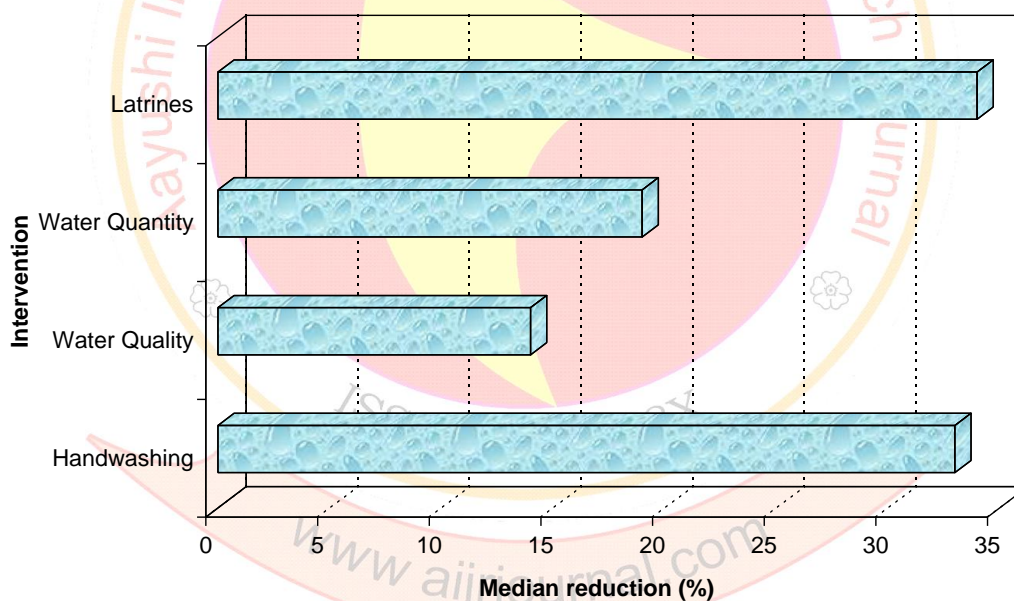
- Intestinal worms infect about 10% of the population of the developing world, and can lead to malnutrition, anaemia and retarded growth.
- 6 million people are blind from trachoma and the population at risk is about 500 million.
- 300 million people suffer from malaria
- 200 million people are infected with schistosomiasis, 20 million of whom suffer severe consequences.

Saved time, particularly for women and children, is a major benefit. Beneficiaries of water and sanitation projects in India reported these benefits: less tension/conflict in homes and communities; community unity, self-esteem, women's empowerment (less harassment) and improved school attendance (Water Aid 2001).

5. Effectiveness of Water Supply, Sanitation and Hygiene Interventions

Improved hygiene (hand washing) and sanitation (latrines) have more impact than drinking water quality on health outcomes, specifically reductions in diarrhoea, parasitic infections, morbidity and mortality, and increases in child growth (*Esrey et al 1991; Hutley et al 1997*). Most endemic diarrhoea is not water-borne, but transmitted from person to person by poor hygiene practices, so an increase in the quantity of water has a greater health impact than improved water quality because it makes it possible (or at least more feasible) for people to adopt safe hygiene behaviours (*Esrey et al 1996*).

Graph 5.1: Effectiveness of Hardware and Hygiene Interventions in Reducing Diarrhoea Morbidity



Source : *Esrey et al 1991; Hutley et al 1997*

Recognizing the link between healthy environment and sanitation, the MDGs stipulate, inter alia, halving, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation.

The TSC programme, the flagship programme of the government, has set an ambitious target beyond the MDGs and aims to achieve universal sanitation coverage in the country by the end of the eleventh plan.

6. World's Best Practices in the Field of Water Supply and Sanitation Services

During its 58th Session, the United Nations General Assembly declared the period 2005-2015 the International Decade for Action. The decade is thus meant to accelerate the realization of the Millennium Development Goals, and in particular ten, which seeks to halve, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation.

1. Transformation of Phnom Penh Water Supply Authority

The Phnom Penh Water Supply Authority (PPWSA) in Cambodia was awarded the Asian Development Bank's (ADB) 2004 Water Prize for its transformation of Phnom Penh's water supply over the last 12 years. PPWSA has, since 1993, increased its distribution network from serving 40% of Phnom Penh to serving over 80%. Non-revenue water - the result of leaks, mis-measurement, illegal connections and illegal sales - is at only 22% (from 72%) and collections are at almost 99% with full cost recovery achieved. Between 1998 and 2004, the Urban Water Supply Project supported the turnaround of two water utilities of Cambodia. The Phnom Penh Water Supply Authority (PPWSA) became a financially viable public enterprise operation under commercial law. 750,000 people gained access to water supply services in Phnom Penh. The Sihanoukville Water Supply Authority (SWSA) became more autonomous in its operations and extended water supply services to 18,000 people in its poor service area. By 2004, both utilities improved their operational and financial performance substantially. The project also assisted in developing a national water supply and sanitation policy to foster sustainable well performing and autonomous public utilities.

The program has proved popular among the low-income groups and has not resulted in a deterioration of the overall financial health of the utility.

2. NEWater in Singapore: Public Utilities Board (PUB) Singapore

Ever since Singapore was founded in 1965, it has used its role as a centre of commerce to compensate for its dearth of natural resources. But one resource has been especially troublesome: WATER. Singapore, an island nation, has none of its own and imports most of its drinking water by pipeline from neighbouring Malaysia.

PUB is the National Water Agency in Singapore charged with water, wastewater, and storm water management in the city state. PUB's holistic approach has resulted in a lower dependence on external water sources by diversification of water sources including water reuse, desalination, storm water storage in new water storages, and supply of very high-quality recycled water to industry with some internal reuse of this supply. Singapore presents a challenging environment for water resources management, as it is a small but densely populated island city state.

The NEWater factory, a pilot plant that demonstrates partly home-grown technology for filtering sewage NEWater incorporates the cutting edge of filtering technology. Sludge comes in and passes through thousands of white plastic spaghetti-like tubes. Since the pores along the sides of the tubes are only as wide as 60 water molecules, water is squeezed out easily but solid particles are not. The filtrated water is then forced through a membrane with even smaller pores, removing anything that would have made it this far. And just for good measure, the water is irradiated with intense ultraviolet light. Not leaving anything to chance, the government has put water conservation into its school curriculum, including comic books with scary analogies, such as a wasted planet that consumed all its water.

PUB has significantly reduced water losses due to leakages in pipes and inaccurate meters. It has 100% servicing of its population with water and waste water services and strong political and public acceptance of its policies and services Reclaimed water branded *NEWater* in Singapore is recognized for its high quality. Singapore has also been able to maintain low water costs for households on the lowest tariff water supply despite the major capital investments in new equipment

and systems. Its household directed campaign of 'Water-efficient homes' helps residents to save water at home and reduce their water bills. Through an extensive partnering programme with the water industry in all aspects of implementation it has been a model of outsourcing skills.

PUB has won the prestigious 2007 Stockholm Industry Water Award.

7. Best Practices in Water Supply and Sanitation in India

The Ministry of Urban Development, Government of India, in partnership with the Gesellschaft für Technische Zusammenarbeit (GTZ) and Administrative Staff College of India (ASCI) has instituted the National Urban Water Awards (NUWA) in the year 2008 for urban local bodies and water boards to recognize, inspire and celebrate excellence in urban water management. The award has been constituted under various categories namely, (i) Technical Innovation, (ii) Financial Reforms, (iii) Services to the Poor, (iv) Citizen Services and Governance (v) Public Private Partnerships and (vi) Urban Sanitation

The Awards are aimed at recognizing and disseminating good practices in water management that have led to improved service delivery.

1. Urban Administration and Development Department (UADD), Government of Madhya Pradesh (GoMP) and City Managers' Association, Madhya Pradesh got the 2011-12 NUWA award in Communication Strategy and Awareness Generation category for improving access to toilets to urban poor

The Urban Administration and Development Department (UADD), GoMP introduced a comprehensive communication strategy for promoting universal access to safe sanitation in Madhya Pradesh. The communication programme played a key role in implementing Integrated Urban Sanitation Programme (IUSP) of GoMP through demand creation and behaviour change. Over 318 community toilets in 52 Urban Local Bodies (ULBs) and 15,538 individual toilets were constructed and innovative use of Information, Education and Communication (IEC) is playing a key role in functionality and sustainability of this programme. This initiative has resulted in minimisation of open defecation.

Sanitation initiatives taken earlier were not successful as only construction of toilets was not enough without proper IEC and awareness activities.

The Government of Madhya Pradesh (GoMP), to tackle sanitation challenges, launched a state level sanitation mission and initiated the Integrated Urban Sanitation Programme (IUSP) in line with the Government of India's National Urban Sanitation Policy 2008. IUSP was designed to be demand driven and led by the community. It was a pilot programme to make at least 4-5 towns open defecation free, which can be later replicated in other cities and towns.

To recognise better performing ULBs, an award scheme was launched and three ULBs namely Sailana, Kukshi and Panna were given the awards for better implementation of the programme. IEC initiated under IUSP resulted in motivating citizens for usage of toilets and to adopt hygiene practices which has led to successful implementation of the programme and achieving the target of universal sanitation.

2. Uttarakhand Jal Sansthan got the 2011-12 NUWA award in Technical Innovation category for improving and monitoring the water quality.

Rapid urbanisation is polluting the water bodies. Earlier, as there was a natural cleansing process and the water sources were not polluted, required attention was not given to check whether the raw and supplied water was safe for consumption or not. But at present, there is a need to check the quality of water at the sources and tackle with the quality related problems.

UJS had three water quality testing laboratories at Dehradun, Srinagar and Nainital but they were not equipped with proper equipment and facilities. As a result, the quality of water was tested on a few parameters and where required. The water samples were analysed at PCRI, Haridwar, IIT, Roorkee and State Health Institute, Lucknow, Uttar Pradesh. As the process was very expensive and time consuming, it was not possible for the UJS to analyse all the water samples from different sources.

Uttarakhand Jal Sansthan (UJS) introduced a comprehensive water quality monitoring protocol as per IS:10500 in the state of Uttarakhand. As per Service Level Benchmarking Framework of Government of India, sampling, monitoring and reporting is being carried out. UJS supplies drinking water from about 31,000 water sources. UJS took the initiative to test the water sources and established a state of the art laboratory “State Level Water Quality Analysis Laboratory” with modern equipment at Dehradun. Twelve more laboratories were established at different locations covering all districts in the state. Tests are conducted in Dehradun laboratory on all the parameters specified by IS:10500, except the radioactivity test. UJS strengthened the remaining two laboratories already existed at Pauri (Srinagar) and Nainital and established 10 new laboratories at Haridwar, Tehri, Uttarkashi, Rudraprayag, Chamoli, Udham Singh Nagar, Almora, Bageshwar, Pithoragarh and Champawat covering all the districts which are fully equipped.

Department also utilises the services of Shriram Institute for Industrial Research, Delhi for testing the samples on 20 water quality parameters. UJS is testing the sources on 20 parameters in its own labs and some at Shriram Institute for Industrial Research, Delhi.

The state level, laboratory in Dehradun is equipped with high quality testing equipments. Random samples from each district are being tested on 30 parameters. The results are being uploaded on the website of Government of India (indiawater.gov.in). For water sampling, preservation, transportation, testing and analysis the American Public Health Association (APHA) guidelines and IS: 3025 (different parts) protocols are being followed.

Training programmes were also conducted to support implementation of water quality monitoring protocol.

8. Mapping Water Supply and Sanitation Services of BMC with Health of Urban Poor

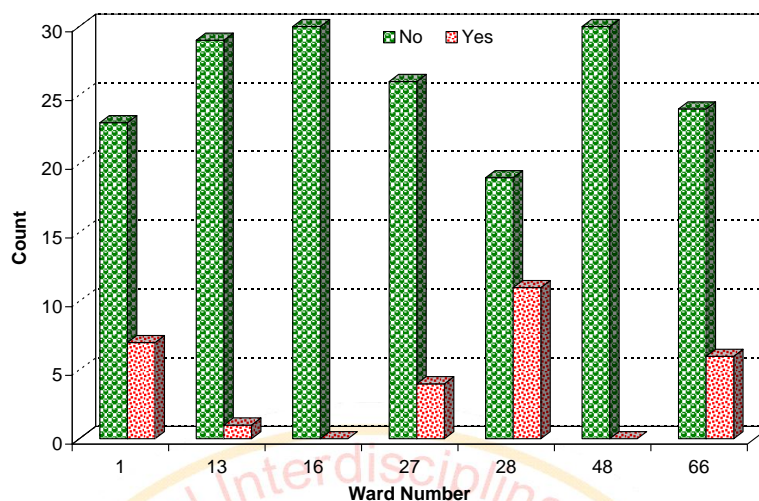
1. Family Members Going Out for Open Defecation

Table 8.1

Ward No.		No	Yes	Total
1	Count	23	7	30
	% of Total	10.95	3.33	14.29
13	Count	29	1	30
	% of Total	13.81	0.48	14.29
16	Count	30	0	30
	% of Total	14.29	0	14.29
27	Count	26	4	30
	% of Total	12.38	1.9	14.29
28	Count	19	11	30
	% of Total	9.05	5.24	14.29
48	Count	30	0	30
	% of Total	14.29	0	14.29
66	Count	24	6	30
	% of Total	11.43	2.86	14.29

Total	Count	181	29	210
	% of Total	86.19	13.81	100

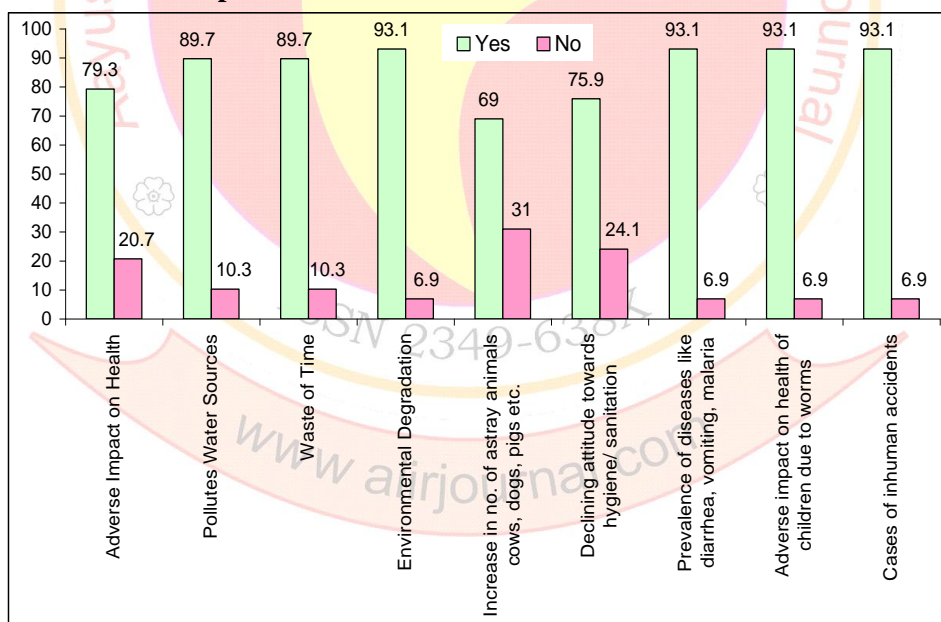
Graph 8.1: Family Members Going Out for Open Defecation



Interpretation:

Graph 8.1 shows that 14% of the total sample population goes out for open defecation. If we closely observe the wards which are affected by open defecation, we find that they are all slum wards. Ward no. 28, which is Ambedkar ward, has 38% of its population going out in open for defecation. As discussed earlier open defecation and improper sanitation is the root cause of all problems, the situation in urban slums is alarming and needs attention of BMC authorities.

2. Problems due to Open Defecation



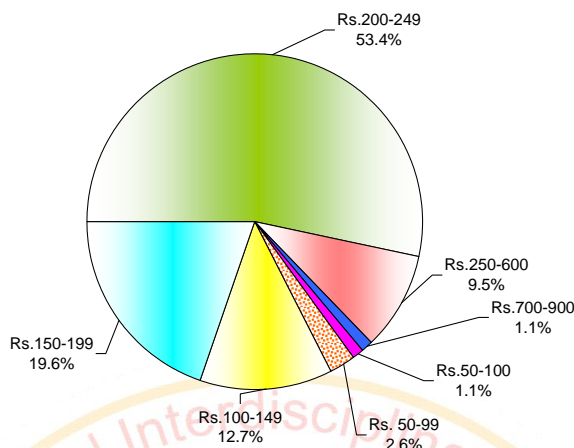
Graph 8.2: Problems due to Open Defecation

Interpretation:

Referring to Graph 8.2, we find that majority of the customers have expressed that the one of the main problem due to open defecation is the adverse impact on health of elders and children. Since

people have to travel a lot of distance for defecation it leads to waste of time which has a direct influence on their employability. People have also expressed that it pollutes water sources too.

3. Expense in Buying Water

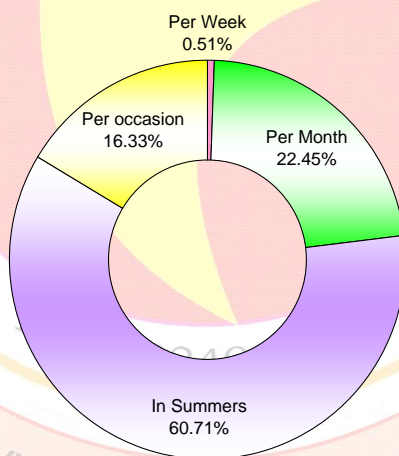


Graph 8.3: Expense in Buying Water

Interpretation:

Data in Graph 8.3 indicates that around 54% of the customers spend 200- 250 Rs. a month in buying water. When we relate this amount of spending from our urban poor customers it becomes a big amount in the small amount they earn.

4. Frequency of Buying Water

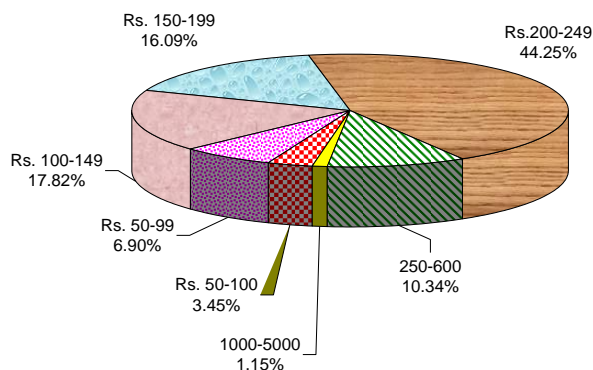


Graph 8.4: Frequency of Buying Water

Interpretation:

61% of the respondents buy water in summers, while in normal course 22% of them have to buy water every month.

5. Loss of Pay Due to Inability to Go to Work in a Month

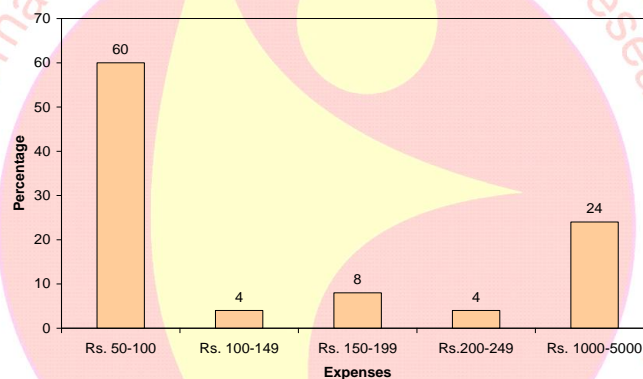


Graph 8.5: Loss of Pay Due to Inability to Go to Work in a Month

Interpretation:

Looking to the Graph 8.5, 44% of the urban poor have to suffer loss of pay to the tune of 200-250 Rs. due to inability to go to work in a month. Another 33% loose 100-200 Rs. Per month. This is quite big an amount for the urban poor to loose and affects their financial health.

6. Expense in Drinking Water Pipe Repairs

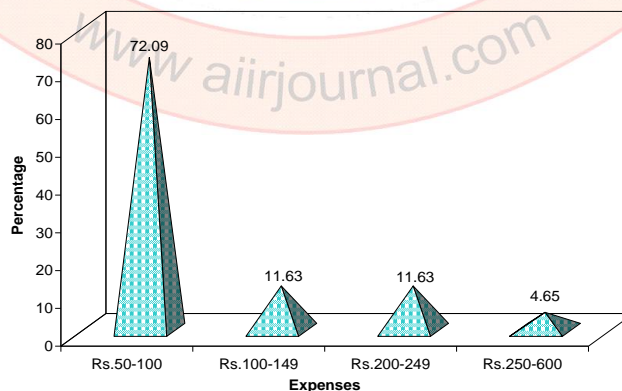


Graph 8.6: Expense in Drinking Water Pipe Repair

Interpretation:

Graph 8.6 says that 60% of the respondents spend 50-100 Rs, on drinking water pipe repairs. There are also 24% of the customers who spend around 1000-5000 on it. This speaks about the quality of pipes being used.

7. Expenses in Cleaning of Sewer Line

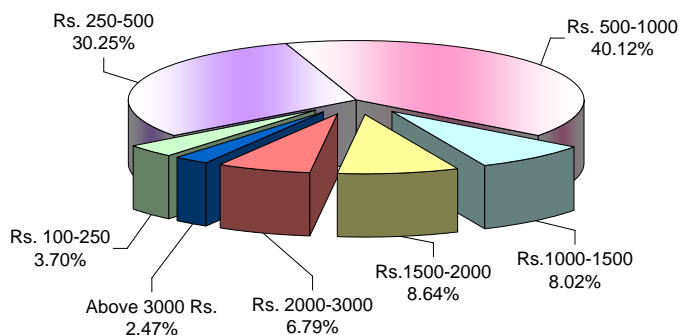


Graph 8.7: Expenses in Cleaning of Sewer Line

Interpretation:

Cleaning of sewer line is a service which should be provided by BMC, while according to table and Graph 8.7, 72% of the customers pay 50-100 Rs. 23% pay 100-250 Rs. time to time.

8. Money Spent in a Year on Illness



Graph 8.8: Money Spent in a Year on Illness

Interpretation:

40% of the customers spend 500-1000 Rs. in a year on illness, 30% spend 250-500 Rs. on illness. This is accompanied by time loss in showing to the doctor which again leads to pay cut in case of urban poor affecting their financial health.

9. Findings and Observations

Following are the findings on the basis of the present research regarding mapping of water supply and sanitation with health and employability of urban poor:

In the present research work it was observed that inadequate sanitation is mainly a problem of urban poor who reside in urban slums.

It is clear from the data analysis that 14% of the total sample population goes out for open defecation. If we closely observe the wards which are affected by open defecation, we find that they are all slum wards. As discussed earlier open defecation and improper sanitation is the root cause of all problems, the situation in urban slums is alarming and needs attention of BMC authorities.

It was analyzed that the main problem due to open defecation is the adverse impact on health of elders and children. Majority of the urban poor have to suffer loss of pay due to inability to go to work in a month. Further most of the customers spend 500-1000 Rs. in a year on illness, which is accompanied by waste of time in showing (wife or children) to the doctor/ time taken to recover from illness which again leads to pay cut in case of urban poor

The data analysis also revealed that around majority of the customers spend a lot of money in buying water, drinking water pipe repairs, cleaning of sewer line etc. When we relate this amount of spending from our urban poor customers it becomes a big amount in the small amount they earn.

The objective to study the relationship between water and sanitation services delivered by Bhopal Municipal Corporation with the health of the urban poor has hence been studied and it can be concluded that inadequate sanitation is mainly a problem of urban poor who reside in urban slums.

Latest Developments

1. With the increase of the limits of Municipal Corporation, Bhopal, now 85 wards have been made. So with the newly included area for water supply the scheme has been planned for the strengthening of water distribution in the former Municipal area.
2. Under JNNURM and Citizen Plan, the work of laying the water distribution system in the entire 70 wards of Bhopal city is being done.

3. Under the Atal Mission for Rejuvenation and Urban Transformation (AMRUT) Scheme, water supply schemes IN Bhauri area and changing of Kolar Gravity and feeder main has been proposed.
4. In order to prevent the water supply problem, the Government of Madhya Pradesh has sanctioned Rs.52.10 crore based on Kerva Reservoir Water Supply scheme. 85% of the said work has been completed and it is targeted to complete the entire work by June, 2018.
5. It is proposed to supply water from all the 144 available tanks in Bhopal city, out of which, water supply has been started from about 118 tanks. Upon completion of the plan, it will be possible to supply 475 MLD of water for the estimated population of 27.5 lac of Bhopal city for the year 2025 which will be sufficient as per norms for use of 150 liter per person per day.
6. The Corporation has developed MAS – Municipal Administrative System. It is a centralized, online and integrated information system where Self Assessment of Property Tax, Payment of Property Tax / water tax, Registration of Death / Birth. In the second phase services like Trade Licensing, Transfer of Title, Tax Assessment, Sanitary Certificate, Advertisement Licensing, Payment of Water / Utility Bills, New Water Connection Application, Building Permission services are being provided online.
7. BMC has also started the facility of Tele samadhan call center for grievance handling which helps in tracking the complaints and fast disposal of the complaints.
8. Project UDAY, Narmada Water Phase IV has also been completed and Narmada water is being supplied to the citizens of Bhopal.

10. Recommendations and Suggestions

Urban Local bodies need to stand up to the requirements of the cities. Focusing on BMC, a lot of reforms are taking place but much more needs to be done to meet the expectations of the stakeholders specially the customers.

Following recommendations have been framed keeping in mind the constraints under which a government organization functions.

1. Improving Tax Collection

As per the analysis respondents have strongly expressed their dissatisfaction and have rated BMC as *inefficient in tax collection*. The Officers and People's Representatives expressed that only by improving the facilities tax collection can be improved. They further suggested that BMC should develop footpaths, gardens, provide better roads, electricity, water and sanitation services, focusing on rehabilitation of slums, fast public grievance redressal and starting online tax payments (which has already been started by BMC)

Further they expressed that the officers should increase their visits in field so that they get to know the ground realities

Recommendation to overcome this inefficiency can be a quick response system to the customer needs and problems coupled with an efficient metering system and transparent billing and collection which would substantially improve the 'willingness to pay' of the public.

Another significant area is to put people at centre stage and involve the community in regard to development of safe drinking water systems and create the proper environment for developing a attitude of 'willingness to pay' through the resident welfare Associations, Ward Committees, Councillors, city authorities etc. so that a deep sense of participation is ensured. Further, in the unbundling process in the water supply provision and management sector the community can be allocated certain physical roles to play in this important sector.

2. Incorporate Recycling Initiatives

In India, water is essentially used as a onetime commodity. Often treated and un-treated water is used indiscriminately. There is substantial scope for segregated use of the water for appropriate uses and recycling of the waste water for further use for gardening, industries, street cleaning, fire fighting, agriculture etc. This also brings in another important consideration that the same quality of water use for drinking purposes need not be (mis)used for large number of other activities like flushing, washing besides other uses, and from that point of view, the possibilities of alternate water supply systems could also be kept in view for potable and un-potable water.

BMC should concentrate on water demand management (WDM) strategy than creation of more assets. Main activities to be taken up under WDM are; (i) Bulk and consumer metering; (ii) District Metering Area/Zoning; (iii) leak detection and repair; (iv) rationalization of tariffs; (v) accounting and billing reforms; and (vi) awareness campaign for water conservation.

3. Vibrant HR Strategy

3.1 After going through the finding of the present research it is strongly recommended that BMC should draft and implement *key performance areas* for each managerial level, innovative motivational strategies as soon as possible. This HR strategy will definitely revitalize and rejuvenate the entire thrust and focus of the corporation.

3.2 Posting Competent Officer as Municipal Commissioner

Some of the people's representatives have expressed the need of an IAS officer as municipal commissioner. Looking to the number of National and International projects worth crores going on in the city, execution of such big projects requires project management skills. Looking to the requirement of the post it is recommended that a senior and an experienced officer should be posted as Municipal Commissioner of BMC.

4. Capacity Building and Training Programs

The *capacity building and training* programs at BMC should be made and offered to the employees after a careful and thorough training need analysis (TNA). This will definitely improve its efficacy and importance. The employees should also be made to realize the importance of capacity building and skill up gradation. It should be linked with the performance and promotion of the employees. In addition to this there should be a constant follow up to make sure that the employees have really benefited.

4.1 Since BMC is handling so many National and International projects there is a dearth of technically qualified staff to handle the contracts. Considering the water and sanitation sector, in pursuance of the statutory provisions, the responsibilities of the local bodies include identification of sources, generating of potable water from those sources, distribution of water, fixation of tariffs and charges, collection of revenue and operation and maintenance. Research Study reveals that there is a substantial shortage in the staff strength of appropriate calibre to deal with the above complex issues.

In such a situation the corporation should hire technical people and get the capable staff trained.

4.2 Research analysis shows that the stakeholders have expressed strong discontent with the behaviour of the staff of BMC. Corporation should train its field staff with soft skills to handle the customer well and with care. A dis satisfied customer negatively publicizes about the image of the corporation among many other customers, which is a big loss to the corporation. Hence sensitizing and training the staff of the complaint handling department and the field staff is very crucial for the progress and long-term sustainability of the corporation.

5. Outsourcing Services

All the stakeholders in the research have expressed dissatisfaction with the various services of BMC.

Recommendation in this regard is that amongst the various services, some of the services can be out sourced to private bodies. However outsourcing provides an incentive for producers to lower quality in order to reduce costs. The cost reductions per se tend to be efficiency-improving, but to prevent a deterioration of service quality policy makers must spend more resources on monitoring quality.

Creation of infrastructure won't serve any purpose until and unless people are aware of the importance of water and sanitation. It is very clear from the strong response of the stakeholders that there is a dire need of *educating people* about the usage of water and sanitation. BMC should take Medias help in creating awareness amidst the customers.

These recommendations if implemented seriously will bring long term institutional changes in Bhopal Municipal Corporation which will make it stand on its own glorifying 'Bhopal' the city of Lakes.

11. Conclusion

Urban local government institutions/municipalities are constituted for the maintenance and planned development of urban areas. The objective is to ensure that suitable levels of infrastructure and services are available to the citizens. In many parts of India, the quality of life in urban areas is miserable and the citizens lead a difficult life.

There are many developing countries in the world where service levels in urban areas are much below the standards and the citizens lead a difficult life. It is obvious that such conditions also affect adversely the productivity of urban areas. Much of the blame for the prevailing situation goes to the local government institutions, which are the main actors in the governance process at the local level. This is due to the fact that urban local governments (also known as municipalities), on the one hand, recover costs incurred in service provision by levying a variety of taxes and non-taxes, and on the other, fail to meet the expectations of the citizens.

An important issue that arises here pertains to the condition of urban local governments and the urban areas in the light of recent urban sector reforms. The present scenario is such that several legal reforms are yet to be implemented throughout the country and other reforms are visible only in a few large urban centers of the country.

Over the years there has been a decline of local self government institutions in India in terms of inadequate devolution of powers and poor management and governance. There has been a complete lack of financial viability and sustainability of local self government institutions (ULBs). This has resulted in inadequate service delivery at ground level.

The local bodies need to be sensitive to the needs of their customers specially the urban poor who have to bear the cost of bad services from them in terms of their financial as well as physical health.

The TSC programme, the flagship programme of the government, has set an ambitious target beyond the MDGs and aims to achieve universal sanitation coverage in the country by the end of the eleventh plan.

The Ministry of Urban Development, Government of India, in partnership with the Gesellschaft für Technische Zusammenarbeit (GTZ) and Administrative Staff College of India (ASCI) has instituted the **National Urban Water Awards (NUWA)** in the year 2008 for urban local bodies and water boards to recognize, inspire and celebrate excellence in urban water management.

Feedback system forms a very important link in the efficient functioning of an organization. Customer Satisfaction is the aim of this tool. In the government's reform of public services customer satisfaction has become a key plank.

Looking to the latest initiatives been taken by BMC from governance point of view, namely MAS ,VTMS, Tele samadhan call centre and Project UDAY, we can conclude that BMC is going on the right path towards becoming more professional and customer centric. However bigger incremental steps may speed up the process of development.

The present research work is a small step forward towards the issues of urban development. Looking to the growing importance of Urban sector, there is a huge scope of research in this area.

12. References

1. Cities in Transition. (2000). Washington, D.C.: The World Bank.
2. Vekateshwaralu, U., Urbanization in India, New Age International Pub., Delhi, P.235.
3. Ibid. P. 235.
4. Ibid.P. 235.
5. Registrar General of India, 2001. Primary census abstract. Total Population: Table A5, New Delhi: Registrar General and Census Commissioner.
6. WHO, 1999” Creating healthy cities in 21st century”, Chapter 6 in David Satterthwaite (Ed.). The earthscan reader on Sustainable cities, Earthscan publications London.

13. Bibliography

Books

- Black C. Working for a Healthier Tomorrow, London: TSO, (2008).
- Chaubey P.K, Urban Local Bodies in India: The quest for making them Self Reliant, New Delhi: IIPA (2003).
- Finch, Byron. Operations Now. 2nd ed., Boston: McGraw-Hill Irwin, (2006).
- Glaeser, Edward, and John R. Meyer, Chile: Political Economy of Urban Development, Cambridge, MA: Harvard University Press eds. 2002.
- Hubbard & Hall, The entrepreneurial city and the new urban politics, Chichester; New York: Wiley, (1998).
- Jensen-Butler, C. Cities in Competition: Equity Issues. Urban Studies, Pg.865-891. (1999).
- Lahiri-Dutt, K., and G.Samanta, Million Cities of India: A Review of 2001 Census Data, Urban India, Pg.: 97-110(2001).
- Mathur M.P., Chandra R., Singh S, Chattopadhyay B, Norms and Standards of Municipal Basic Services in India. New Delhi: NIUA, (2007).
- Mathur O.P. and Thakur S, India’s Municipal Sector: A study for the Twelfth Finance Commission. New Delhi: NIPFP (2004).
- Mathur, O.P. India the Challenge of Urban Governance, National Institute of Public Finance and Policy, New Delhi, 1999.
- NIUA: Financing Urban Infrastructure in India, National Institute of Urban Affairs, Delhi, 1997.
- Noll, Roger, M.Shirley and S.Cowan “Reforming urban water systems in Developing countries,” in Economic Policy Reform: The Second Stage, London: University of Chicago Press. (2000)
- Sachdeva, Pardeep ,Urban Local Government and Administration in India, Kitab Mahal Allahabad(1993)
- Sridhar K.S., Mathur O.P, Nandy A, Costs of Urban Infrastructure: Evidence from Indian Cities, NIPFP, New Delhi (2006).

- Susanna Lundström and Per Ronnås. 'Integrated Economic Analysis for Pro-Poor Growth', Department for Policy and Methodology, SIDA(2006)
- TERI, Benchmarking Performance- A Manual on Performance Measurement in Urban Local Bodies, New Delhi- TERI Press (2004).

Reports & Publications

- Aijaz Rumi., Working paper19: Challenges for Urban Local Governments in India. Asia Research Centre, 2007
- Census of India: Primary Census Abstract – Total Population, Series-1, India, Table A-5. (2001a)
- Census of India (2001b): Final Population Totals – Urban Agglomerations and Towns, Series - 1, India. Constitutional Provisions Relating to Village Panchayats and Municipalities in India (1999), Lucknow: Eastern Book Company
- Fox, William and Edmiston Kelly, User charge financing of urban public services in Africa, Working Paper 00-4, International Studies Program, Georgia State University (2000).
- Government of India, Planning Commission. Report of the Steering Committee on Urban Development (including Urban Transport), Urban Housing and Urban Poverty (with focus on slums): Report Number TFYP STEERING COMMITTEE Sr.15(2001).
- Kundu, Amitabh: Trends and Patterns of Urbanization and their Economic Implications in India Infrastructure Report, 2006, OUP, Delhi, 2006.
- Municipal Corporation of Bhopal, City Development Plan 2005, Madhya Pradesh
- NSSO: Drinking Water Sanitation and Hygiene in India, 54th Round, National Sample Survey Organization, Delhi, 2000.
- Planning Commissioner: Report of the PPP sub-Group on Social Sector - Public Private Partnership, Planning Commission, Government of India, Delhi, 2004.
- Raju, K.V, N. Praveen, H.L. Shashidhar, B.K. Anand, "Groundwater in Urban Market: Can it Sustain? A Case Study of Kolar City in South India." Draft Version, Research Report, CERNA, New Delhi (2004).
- Rastogi, Anupam: India Infrastructure Report, 2007, OUP, Delhi, 2006.
- Sahoo, Satyananda, "Infrastructure and Economic Growth: An Empirical Examination," Reserve Bank of India Occasional Papers (2000) 21 (2 & 3): 323-348.
- Savage, David and S.Dasgupta ,Governance Framework for Delivery of Urban Services, in India "Infrastructure Report 2006; Urban Infrastructure," New Delhi: Oxford University Press (2006)
- Sridhar, Kala S, "Institutional Arrangements for Landuse in Ludhiana, Punjab," in India Infrastructure Report 2006: Urban Infrastructure (ed.,3i Network), New Delhi: Oxford University Press (2006).
- TERI. Review of current Practices in determining user charges and incorporation of economic principles of pricing of urban water supply [Project Report no. 2009/A02] 2010
- The Royal Town Planning Institute in Ireland, "Institutional Arrangements for Land use And Transport in The Greater Dublin Area," Response to the Department of Environment and Local Government and the Department of Public Enterprise on their consultation paper (June). 2001
- United Provinces Municipalities Act, 1916, Allahabad: Alia Law Agency (2004). Global Water Supply and Sanitation Assessment, i-80. 2000. WHO and UNICEF.
- WHO and UNICEF Joint Monitoring Program for Water Supply and Sanitation

- World Bank: Attaining the Millennium Development Goals in India, World Bank, Delhi, 2005.
- World Bank, World Development Report 2004. Washington, D.C: The World Bank.
- Zerah, Marie-Helene, Urban Water and Waste Water, in "India Infrastructure Report 2006; Urban Infrastructure," New Delhi: Oxford University Press (2006).
- Zerah Marie-Hélène, "Water Supply and Sanitation in Vijayawada: Analysis of Households' Situation towards Modes and Cost of Access, Consumption and Level of Satisfaction," Research Report, CERNA New Delhi. (2002)

Journals & Periodicals

- Bagchi, S "*Financing capital investments in urban infrastructure,*" Economic and Political Weekly, January 27, 2001: 385-398.
- De Bartolome, Charles A.M and S.L.Ross "*Equilibrium with local governments and commuting: income sorting versus income mixing,*" Journal of Urban Economics 54 (2003): 1-20.
- Reddy M. Madhukar, "*Customer Satisfaction Management in Service Industry.*" The Beacon—NIQR Bangalore Newsletter, July – September 2005. pp – 1
- Shah, Scott and S.Buechler "*Water sector reforms in Mexico: Lessons for India's new water policy,*" Economic and Political Weekly, Jan 14, 2004: 361-370.
- Sridhar, Kala S. "*Firm Location Decisions and Impact on Local Economies,*" Economic and Political Weekly, 38(39),September 27, 2003: 21-30.

Websites

- www.ofwat.gov.uk
- www.pub.gov.sg
- www.rtpi.org.uk/resources/policystatements/2001/jun/pol20010628.pdf
- www.sida.se/publications
- www.unescap.org/huset/gg/governance.html
- www.unhabitat.org/campaigns/governance/activities_1.asp
- www.usmayors.org/USCM/urbanwater/case_studies/
- www.usmayors.org/USCM/urbanwater/case_studies/

Newspaper

- G. Srinivasan, "*Empowering urban Local Bodies to provide better facilities*" Business Line, April 2, (2008).
- Inaugural Address: by Mrs. Anna Kajumulo Tibaijuka, Executive Director, UNCHS, *Launching of the Global Campaign for Good Urban Governanc in India*, Sep 2001, Delhi, India.
- Rao, Govinda M. and Vandana Aggarwal, "*Central Transfers to Offset Fiscal Disadvantages of the States: Measurement of Cost Disabilities and Expenditure Needs,*" Indian Economic Review, 1991, 26(1): 13-34.
- Sehgal. "*Maha strategy to clean up states,*" Economic Times, July 24 (2005).
- Sridhar, Kala S. "*On New Towns of International Standards,*" The Financial Express May 5, 2005.
- World Bank | INRnews, *Improved Financial Management of Urban Local Bodies Critical for Growth*: New Delhi, India, January 21, 2008

1. APA Style Sheet
2. 12-point Times New Roman font
3. Single-spacing throughout the document

4. Double space (instead of indent to designate a new paragraph or section)
5. Top, bottom, and side margins no less than 7/8 of an inch or 2.2 cm
6. Cover page that includes title, author's/authors' affiliation(s), contact information, and topic of the submission
7. Title, authors and affiliations repeated at the beginning of the body of the paper
8. Manuscript not to exceed 5000 words (excluding tables, figures and references)
Manuscripts longer than 5,000 words will be returned for editing
9. Graphs and visuals can be reproduced electronically

Annexure 1

Table 1.1: Institutional Framework for Delivery of Services in Selected Cities

City	Services Provided by			
	ULB	Parastatal	Development Authority	State Agencies
Ahmadabad	All services	-	-	-
Hyderabad	SWM, Roads, Street Lighting, Drainage, etc.	Water Supply and Sewerage ¹	Town Planning	-
Bhubaneswar	SWM, Roads, Street Lighting, Drainage, etc.	---	Town Planning	Water Supply and Sewerage ²

Source: MOUD, GOI

Annexure 2

Table 2.1: GoI Plan Investments since Independence in UWSS

Five Year Plans	Plan Size (Rs Crore)	Allocation for UWSS (Rs. Crore)	%
I Plan (1951-56)	3360	43	1.28
II Plan (1956-61)	6750	44	0.65
III Plan (1961-66)	8573	89.37	1.04
IV Plan (1969-74)	15902	282	1.77
V Plan (1974-79)	39303.49	549.44	1.4
VI Plan (1980-85)	97500	1766.68	1.81
VII Plan (1985-90)	180000	2965.75	1.65
VIII Plan (1992-97)	434100	5982.28	1.38
IX Plan (1997-2002)	859200	18624	2.16

Source: MOUD, GoI

Annexure 3

Table 3.1: Cases and Deaths due to Water-borne Diseases in Various States

States	Diarrhoeal Disease (2006)		Viral Hepatitis (2006)		Typhoid (2006)	
	Cases	Deaths	Cases	Deaths	Cases	Deaths
Andhra Pradesh	1215659	124	17846	28	135550	12
Arunachal Pradesh	32032	30	553	6	9098	23
Assam	"	"	"	"	"	"
Bihar	"	"	"	"	"	"
Chhattisgarh	95202	13	1491	2	21474	6
Goa	7631	0	15	0	68	0
Gujarat	382056	4	9396	16	7290	0
Haryana	285342	42	3983	11	5688	4
Himachal Pradesh	347055	28	835	11	26327	5

J & K	519317	32	5882	0	42369	0
Jharkhand	14752	1	51	0	4707	284
Karnataka	939221	1279	14980	24	96147	5
Kerala	475510	4	7018	6	6219	2
M.P.	318935	88	2499	9	28654	29
Maharashtra	695723	93	43215	131	39663	8
Manipur	13614	17	346	0	2421	2
Meghalaya	178260	33	294	2	6709	1
Mizoram	18063	20	546	11	1392	2
Nagaland	9176	0	112	0	2328	0
Orissa	373748	40	2687	38	15387	9
Punjab	182451	64	3829	17	17008	3
Rajasthan	318169	21	3869	78	14084	131
Sikkim	51433	8	290	2	428	2
Tamil Nadu	116062	12	4523	0	36973	0
Tripura	150750	47	2520	14	18547	19
Uttarakhand	94746	6	3381	0	15020	2
U.P.	284709	55	3716	6	42648	13
W.B.	2622968	964	7433	205	110835	70
A&N Islands	22752	2	213	4	3055	0
Chandigarh	"	"	"	"	"	"
D&N Haveli	74661	4	126	3	646	0
Daman & Diu	109	0	3	0	33	0
Delhi	94398	85	4080	42	13774	18
Lakshadweep	7316	0	86	0	6	0
Pondicherry	137443	8	615	7	1936	1
Total	10079263	3124	146433	673	726484	651

*Note: ("") Means not reported
Source: MoHFW, GoI, 2006*

Annexure 4

Table 3.2: Burden of Major Communicable Diseases in Various States

States	Malaria (2005)		TB (2006)		ARI	
	Cases	Deaths	Cases	Deaths	Cases	Deaths
Andhra Pradesh	39099	0	142057	1184	2465743	434
Arunachal Pradesh	31215	0	15936	38	43426	1
Assam	67885	113	"	"	"	"
Bihar	2733	1	"	"	"	"
Chhattisgarh	187950	3	8689	12	132276	25
Goa	3747	1	2228	0	25559	0
Gujarat	179023	54	41730	238	833339	17
Haryana	33262	0	29900	227	1269205	178
Himachal Pradesh	129	0	14705	140	1545057	161
J & K	268	0	2346	28	383069	0
Jharkhand	193144	21	15516	5	23470	1
Karnataka	83181	26	76687	745	2544300	196
Kerala	2554	6	13840	181	7897043	165
M.P.	104317	44	18866	132	478278	180

Maharashtra	47608	104	52998	795	657432	192
Manipur	1844	3	482	20	12602	1
Meghalaya	16816	41	1900	29	304097	25
Mizoram	10741	74	936	28	41018	26
Nagaland	2987	0	838	0	11792	0
Orissa	396573	255	11443	178	768445	69
Punjab	1883	0	20612	106	601038	66
Rajasthan	52286	22	71180	695	1299772	126
Sikkim	69	0	2155	36	65304	7
Tamil Nadu	39678	0	28979	73	380708	220
Tripura	18008	20	971	27	279702	98
Uttarakhand	1242	0	3522	8	130683	11
U.P.	105303	0	109898	161	502869	81
W.B.	185964	175	89276	820	2020983	894
A&N Islands	3954	0	2898	10	32405	13
Chandigarh	432	0	"	"	"	"
D&N Haveli	1166	0	1544	36	118461	0
Daman & Diu	104	0	25	3	0	0
Delhi	1133	0	13544	993	323392	276
Lakshadweep	0	0	39	0	32093	0
Pondicherry	44	0	7738	125	584161	1
Total	1816342	963	789135	7073	25807722	3464

Note: ("") Means not reported

Source: National Health Profile, 2006, CBHI, DGHS - MOHFW

Annexure 5

Hypothesis Testing: The Health of the urban poor is independent of the Water and Sanitation services provided by Bhopal Municipal Corporation.

Opinion of customer of Bhopal regarding the service delivery affecting the health

Observed Frequency

Category of Customers	Affecting Health (Yes)	Not Affecting (No)	Total
Urban Poor	22	7	29
Other Urban	3	178	181
Total	25	185	210

Expected Frequency

Category of Customers	Affecting Health (Yes)	Not Affecting (No)	Total
Urban Poor	4	25	29
Other Urban	21	160	181
Total	25	185	210

Chi-square Table

O	E	(O-E)	(O-E) ² /E
22	4	324	81
7	25	324	12.96
3	21	324	15.43
178	160	324	2.025
		$\chi^2 = \sum (O-E)^2/E$	111.41

$$\chi^2 = \frac{\sum (O-E)^2}{E} = 111.41$$

Degree of freedom $v = (r-1) (c-1)$,
 $v = (2-1) (2-1)$
 $v = (1) (1)=1$

Table value for $v = 1$ and $\alpha=0.05$ Level of Significance is 3.841

Since $\chi^2 > \chi^2 \alpha (r-1) (c-1)$ therefore we reject the hypothesis.

Therefore we conclude that the water and sanitation service delivery by BMC are adversely affecting the health of the urban poor.

