



Water and Sanitation in Urban Areas of Madhya Pradesh

WaterAid India is thankful to all the different donors/agencies
for their support and assistance



Water and Sanitation in Urban Areas of Madhya Pradesh

Amod Khanna
Chitra Khanna

WaterAid India
2006

© WaterAid India, 2006

Any part of this publication may be translated or reprinted
with due acknowledgement to WaterAid, India

Research Team

| | |
|----------------------|----------------------|
| Principal Researcher | Amod Khanna |
| Research Coordinator | Chitra Khanna |
| Research Associates | Sarita Thakur |
| | Nagina Bano |
| | Gauri Belapure |
| | Ashish Sharma |
| | Arun Kanan |
| | Nidhi Shrivastav |
| | Amit Sahu |
| | Rupendra Kumar Sinha |
| | Bharat Chauhan |
| | Rajendra Pandey |
| | Atul Sahu |

Published by

WaterAid India
1st Floor, Nursery School Building
C-3, Nelson Mandela Marg
Vasant Kunj,
New Delhi - 110070
Tel: 0091-11-46084400
Fax: 0091-11-46084411

Design and Printing

New Concept Information Systems Pvt. Ltd.
New Delhi -110 076
Tel : 91-11-26972748, 26973246

Contents

| | |
|---|-----------|
| <i>Foreword</i> | iv |
| <i>Abbreviations</i> | v |
| <i>Executive Summary</i> | vi |
| Chapter 1 INTRODUCTION | 1 |
| 1.1 WaterAid India | 1 |
| 1.2 WaterAid India (West) | 1 |
| 1.3 Summary of Desk Review | 3 |
| 1.4 Field Study | |
| Chapter 2 METHODOLOGY | 4 |
| 2.1 Objectives of the Study | 4 |
| 2.2 Research Question | 4 |
| 2.3 Scope of Study | 4 |
| 2.4 Sampling Plan | 5 |
| 2.5 Method of Data Collection | 6 |
| 2.6 Training of Research Associates | 8 |
| Chapter 3 PROFILE OF THE CITY SELECTED FOR THE STUDY | 9 |
| 3.1 Demography | 9 |
| 3.2 Brief History | 9 |
| 3.3 Master Plan | 10 |
| Chapter 4 WATER | 11 |
| 4.1 Water Source | 11 |
| 4.2 Water Supply and Accessibility | 14 |
| 4.3 Availability | 21 |
| 4.4 Quality | 22 |
| 4.5 Demands for Water | 23 |
| Chapter 5 SANITATION | 25 |
| 5.1 Preamble | 25 |
| 5.2 Sanitation Status | 26 |
| Chapter 6 RECOMMENDATIONS | 32 |
| 6.1 Replication of Existing Models | 32 |
| 6.2 Developing Demonstrative Processes | 32 |
| 6.3 Issues in Advocacy | 32 |
| <i>Annexure</i> | 33 |

Foreword

The process of urbanisation in Madhya Pradesh gained momentum during 1971-1981 when the state registered an urban growth rate of 52.9 per cent. Though the growth rate seems to be tapering off yet the growth rate of urban population in the state is higher than the national average. The decadal growth rate of urban population of Madhya Pradesh has declined from 43.92 per cent in 1991 to 31.19 per cent in 2001, but this decadal growth rate in 2001 is higher than the national average. With 26.6 per cent of the population residing in urban areas, the state has gained an urban character, a fact that has significant implications for the provisioning of water and sanitation in the urban areas of the state.

This is a study launched by the Regional Office (West) of WaterAid India to assess the urban context in the state and provide an overall framework for long term and short term programming for the Regional Office. This study on Water and Sanitation status of MP was essentially done to profile the State, Institutions and Policy Environment, in 2005. This was carried out in two phases – A desk study, focused on reviewing different approaches and methodologies adopted by government/non government agencies, the financial resources available for WATSAN activities along with the institutional mechanism responsible for delivering WATSAN services to the communities and households. This was followed by a field study to deepen our understanding of the sector and which validated most of the findings of the desk review. The desk study reiterated and underlined the need to look into ground realities in urban areas independently so as to initiate dialogue with the state and discussions among the development professionals on issues in water and sanitation that are specific to urban areas in the state. The present field study generates field data and articulates issues that are biased in favour of the citizens and the poorer sections of the urban community.

Three critical institutional issues identified by the report are noteworthy: firstly, the multiplicity of institutions that are responsible for ensuring water and sanitation in the urban areas dilute the administrative responsibility and is disempowering to the citizens as they are unable to locate the focal point to address their grievances. Secondly, the half hearted decentralisation with constitution of Mohalla Samitis and Zonal Committees without delegation of substantive powers makes people's participation tokenistic. Thirdly, the delay in handing over the colonies by the development authorities and private developers to the urban local bodies leads to loss

of revenue for the local bodies and loss in ensured services to the consumers. Similarly, the regime of fixed water charges, supply of water through community taps to the slum settlements and the strategy of going farther and/or deeper for incremental supplies of water identified in the present study has dimensions that transgress issues of social justice and environmental concerns.

One critical issue concerning slums was that most of these had either private sources or community taps, but given the high density of population in slums, it is not the distance but the density of households per connection that is important. And this density per tap varies from 9 per tap to more than 350 households per tap leading to serious conflict amongst communities. On the sanitation front, no city is fully covered by a sewerage system. The larger cities are partially covered by a sewerage network, but the waste water gets released into the river system without treatment. There is also case of multiplicity of institutions and it is difficult to assess who ultimately has the vision and the resources to draw up a master plan for sanitation in urban areas. The study recommends developing parameters and indicators for assessing the performance of urban local bodies in provisioning of services in water and sanitation and that this will be empowering to both the citizens and the service provider.

WaterAid India is implementing challenging urban water and sanitation projects this year in the Western India Programme Office for the 3 states of MP, UP and Chhattisgarh. WaterAid recognises and appreciates the vast financial and manpower resources with the state government of Madhya Pradesh and the centrally sponsored schemes of Gol. We hope the report will provoke the policy makers and development practitioners to take positions, generate debates that bring more clarity to issues and enables development of programmes with a clear focus on community's concerns and participation of the urban poor.

Released on the World Water Day 2006, we hope this study will assist project implementers and lead to improved, effective, sustainable and affordable water and sanitation for all, specially the poor and marginal city slum dwellers.

Mamita Bora Thakkar
Regional Manager
WaterAid India
Regional Office West
2006

Abbreviations

| | |
|--------|-----------------------------------|
| BHEL | Bharat Heavy Electricals Limited |
| CMO | Chief Municipal Officer |
| DUDA | District Urban Development Agency |
| GCF | Gun Carriage Factory |
| LPCD | Litres Per Capita Per Day |
| km | kilometre |
| MP | Madhya Pradesh |
| MGD | Million Gallons per Day |
| MPEB | Madhya Pradesh Electricity Board |
| NGO | Non Governmental Organisation |
| OHT | Overhead Tank |
| O&M | Operations and Maintenance |
| PHE | Public Health Engineering |
| SDM | Sub Divisional Magistrate |
| sq | square |
| SWM | Solid Waste Management |
| ULB | Urban Local Body |
| WAI | WaterAid India |
| WATSAN | Water and Sanitation |

Executive Summary

1. Background

WaterAid India made a strategic shift in locating its headquarter in India to Delhi and starting its regional offices at Bhopal, Bhubaneswar and Bangalore. This shift is expected to enable the organisation to work closely with the policy makers and to work closely with the most vulnerable communities in Madhya Pradesh, Chhattisgarh, Uttar Pradesh, Orissa, Bihar and Jharkhand.

The regional office at Bhopal had commissioned a study to profile the State, Institutions and Policy Environment of Madhya Pradesh in 2005. The study had highlighted the need for recognising urban Madhya Pradesh as a critical and important sub-sector for intervention within water and sanitation in the state.

2. Field Study

The findings of the desk review identified issues that were based on concerns expressed by the institutions responsible for supplying services in water and sanitation. The people's issues and their expectations from the service providers did not figure in the desk review. Consequently the present field research was undertaken as a primary level study with a purposive sampling bias to initiate a detailed inquiry into issues that have been identified during the desk review and also to address concerns of communities and individuals in water and sanitation in urban areas.

3. Research Question

The objectives of the present study were decided mutually in consultation with WaterAid India regional office. The main research question for the study will be: What is the state & status of water and sanitation in the urban areas selected for the study?

The term water includes water required for domestic consumption; and sanitation refers to disposal of human excreta, liquid waste and household solid waste. The term state has been used to reflect the present levels of demand and supply of water and sanitation in the household and the term status is used to make assessment of services in water and sanitation with respect to their adequacy and quality. The expression status has been interpreted to take into account trends related to levels of services and their demand and supply at the urban level.

The main research question has been broken down to include Demand for water; Sources of water; Accessibility of water; Adequacy of water; Water Quality; Institutional Issues; and Sanitation

4. Sampling Plan

The current study adopted a purposive sampling plan for the selection of urban areas in the state. In all four Municipal Corporations, namely, Bhopal, Indore, Ujjain and Jabalpur; two Municipal Councils – Badnagar and Panagar and two Nagar Panchayats – Tarana and Shahpura were selected for the study.

Sampling within the city was undertaken to ensure adequate geographical coverage as well as coverage of 'problem' and 'good' areas as defined by the local body. Within the selected area the issues of water and sanitation were intensively studied in terms of all the users of water – residential (high, middle, low and slum settlements), commercial, and institutional groups.

5. Method of Data Collection

The sources of information for the study included domestic, institutional, industrial and commercial users of water as well as different departments of the urban local body, elected representatives, colonisers, real estate developers and community based organisations.

The tools for data collection included individual interviews, focus group discussions, semi-structured observations, social mapping and historical information.

The research associates were trained over a period of two days on issues in water and sanitation and in the ability to conduct interviews and focus group discussions.

6. Findings of the Study

Water Sources

- The private sources of water supply for the commercial/industrial and institutional users are mainly ground water through tubewell in all the cities surveyed. The study did not find any of the slum settlements in any of the city developing their own (private) source of water. They rely only and only on the community sources of water either supplied through the community taps or handpumps.

- The critical factors that prompted growth in private sources of water are the lack of faith in the citizenry on the urban local body regarding their ability and the capacity to supply regular and sufficient quantities of water in all seasons.
 - Municipal bodies adopt a strategy for drawing water from multiple sources – surface water, sub-surface water and ground water.
 - The availability of water in the sources used by the municipal body and those in the private domain report a strong seasonality factor that affects the availability of water from the source.
 - The stored water sources used by the municipal bodies are not within their jurisdictional control. The ownership of these sources is either with the state government or Water Resources Department
 - There does not seem to be a cost benefit analysis at the local body level of the strategy to secure water from sources that are outside the jurisdictional control of the municipal body.
 - The conflict between the municipal body and the Water Resource Department are frequent as the department exercises control in the release of water.
 - It pays more to the municipal body to sell land and/or earn through rental income than create a water body and generate revenue through water tax. Hence the focus of the municipal body is on land use that can maximise its income rather than think of land use that can improve its environmental resources within its jurisdiction
 - The surface water reservoirs being accessed by the municipal bodies are under competitive uses: irrigation, domestic water requirement for adjoining rural areas, fishing, national park, recreational use and water sports. These competitive uses of water represent potential areas of conflict between the water that is drawn by the municipal body and other demand for water.
 - A perusal of the master plan of large cities reveals that the plan does not devote more than a page to the issue of water supply in the city. This page documents the existing water sources and estimates the water requirement for domestic purpose during the planning period.
 - The master plans give elaborate maps and possible alternative uses of land for different sections of the city. Of the different land uses considered in these plans, possibility of a water body does not appear as one of the possible land uses in any of the master plans.
- a community connection. Also, the data does not provide number of taps so that population density per tap is calculated and the pressure of accessing water from tap can be assessed.
- Filtration plants in the cities are now more than 50 years old that have outlived their lives and the technology needs upgradation.
 - The colonisers develop their own source of water (tubewell) and supply water to the residents. The colonisers do not apply for connection from the municipal source nor do they pay any royalty charge to the municipal body for drawing ground water and selling it to the residents.
 - The Corporations are able to recover only 20-30% of the cost of water supply schemes and Councils and Nagar Panchayats are able to recover 40-80% of their costs.
 - Fixed water charges are levied on the residents in cities. This system is iniquitous as it does not collect charges on the basis of water usage. Secondly, this system does not promote conservation in water usage. Thirdly, low fixed charges imply that a high quality of water (treated and filtered) is being used for purpose that does not require water of such quality – watering of plants, washing of vehicles, washing of floor etc.
 - Metering of water is critical to enable the municipal authority to recover its cost and establishing a system that collects charges based on usage and has the inherent advantage of promoting conservation.
 - If a pipeline passes through a slum or low income colony and there are no sufficient community taps within this colony then the chances of pilferage of water either by breaking the pipeline or by loosening its nuts at the service joints is a common phenomenon.
 - In slums the issue of who takes water first and how much water each person can take is reported as the major issue by the households and also the reason for frequent (and sometimes violent) conflict amongst the dwellers.
 - Hotels and restaurants get municipal water and have also developed their own source which in most cases is tubewell in all the cities studied. The hotels do not pay any extra amount for drawing ground water and using it for commercial purpose to the municipal body.
 - Government hospitals are provided free water by the municipal authorities. The nursing homes, clinics and private hospitals in private domain take municipal connection and install their own tubewells to supplement the water supply from formal sources.
 - Hostels are predominantly dependent on borewell to meet their water requirements.
 - Generally community tap connections are provided by the urban local body to supply water to market places.

Water Supply

- The present study identified that the Census data fails to provide the vital clues that are critical to determine the nature of accessibility of the households to the water source. For example, Census methodology does not distinguish between tap as a private connection and tap as

- Government schools get municipal water either through tap connection or through the handpump. Private schools pay for the connection at subsidised rate and in some cases, mostly large schools, have their own ground water source.
- Water markets existed in all the cities studied during the present exercise. Providing water through the tanker is the most common form through which these markets operate.

Availability

- The issues of frequency, duration and pressure of water supplied by the local body are the major sources of discontent in most of the residential colonies and slum settlements of the city.
- Any shortfall in frequency, duration and pressure of water constituted the situation of water insecurity for the households. The well-off sections of the city resort to installation of tubewell, accessing water from far away source, or pooling resources and getting a tanker for a cluster of houses. The poorer households and the persons residing in slum would either loosen the nuts and bolts of the pipeline near their settlement, access water from pond, well or from another public source (handpump, factory etc).

Water Quality

- In middle and higher economic class colonies there was awareness regarding the source of water supply and a concern for quality. However the residents are uninformed on standards of water quality and how can they deal with the situation where they are being given un-treated and raw water (by coloniser and even by municipal authorities).
- Colonies housed with low income residents are generally not aware of the source of water and their concern with quality is of lesser degree.
- The study was unable to procure a test plan or list of parameters to be tested from any PHE official in any of the cities.
- The PHE cell of the local body undertakes quality surveillance but the information so collected does not become part of the information fed into the public domain.
- Surveillance system that monitors quality of water from all sources (supplied by local body, colonisers, development authorities, housing boards etc) is assessed by the study team as a felt need of the citizens.

Demand for Water

- The quantum of demand for water is dependent on the degree of assurance that the consumer is able to assess from the supplier. The degree of assurance is assessed in terms of the time period (days) for which the users need to store water before the next supply of water will be released.

Sanitation – toilets

- There is a wide variation in the data collected on conversion of dry latrines into flush type toilets in smaller cities from the field and the claims stated by the urban local body.
- The households that report no facility of private or community toilets are resorting to open defecation. The site for defecation depends on the space available near the settlement – nallah, railway line, trees and mines, open ground and dried up ponds.
- The experiment with community toilets has not been encouraging.
- 90% of the institutions covered under the study had functional toilet facilities. These institutions were well connected with water facility and had also employed a person for cleaning toilets.
- The level of information available to the citizens regarding the proper and the existing method of disposal of toilet waste were found to be quite low in all the cities.
- All the residential colonies covered during the study had septic tanks, the size of which was unknown to the residents.
- In the ‘old city’ area of larger cities the study found that the private toilet from each house is connected to a pit that is covered and is either within the premise (aagan) or in the immediate vicinity of the house. The responsibility for getting the pit cleaned is that of the household and they normally lodge their requirement with the corporation and get the pit cleaned.

Liquid Waste Disposal

- The officials of the urban local bodies claim coverage of 50-70% of the city from drains. This coverage is contested by residents and by the councillors.
- The maintenance of drains has been identified as a problem both by the officials of the urban local body and by the citizens.
- A major issue that threatens to create an ecological disaster in the cities is the gradual process of converting natural drainage lines in to drainage/sewage disposal lines of the city. The erstwhile drainage lines that were feeding to the major rivers have been converted into drainage disposal lines by the administration and the people.

Solid Waste Disposal

- All the local bodies have dumping grounds for solid waste disposal, but none of these bodies have a system of segregation of solid waste either at the point of collection or disposal.
- The Nagar Panchayats and the Municipal Councils have a system of solid waste being collected in hand carts and then ferried by tractors to

the dumping ground. The Corporations have infrastructure that includes garbage collectors (from dustbins or open spots), designated collection point at the ward level from where the dumper carries the waste to the dumping ground.

- Dustbins are a rarity. In all the cities the upper class colonies have a better network of dustbins and a better frequency of their disposal. The remaining town is denser and generating more waste, has less space to dispose it.

Hospital Waste Disposal

- Hospital waste falls within the purview of the Pollution Control Board. The hospitals or any other institutions generating biomedical waste pay authorisation fees to the Board. The fee is based on the number of beds in the hospital. For annual renewal of this fee the hospitals have to get a certification from the agencies responsible that they are handling the waste in accordance the legal framework.
- The hospitals covered during the study at Bhopal, Ujjain, Jabalpur did state that they hand over their waste to the local body which disposes the waste according to their norms. The local bodies burn the waste in the incinerators. The study however was unable to verify the claim of the hospitals and the Corporation.

Institutional Issues

- Private toilets and drainage are the responsibility of the PHE cell of the urban local body, sewerage network is the responsibility of the PHE department and SWM is the responsibility of the Health Department of the Municipal body. In this scenario of multiplicity of institutions it is difficult to assess the overall body that has the vision and the resources to draw up a master plan for sanitation in urban areas.
- The team assessed that the elected representatives did not have a vision or idea regarding cleanliness and sanitation of the city and the activities that are required for the same.
- The Master Plan for development of the city does not focus on developing the Master Plan for sanitation of the city. It only details the norms that are applicable but does not for example identify possible sites for waste disposal of sites for treatment plants etc.
- The density of houses in slum settlements does not indicate the possibility of private toilets in all the houses. The potential for community toilets is immense and the only reason for failure encountered by the study has been disconnection of water supply. Where the community toilets are being used the users are paying for it or taking extra initiative to secure water for the toilets.

- The study found a high willingness to participate in residential colonies comprising of middle and lower middle class households. The residents of these areas want to know about the rules related to water and sanitation and are concerned as to how their money is being spent by the coloniser and the local body.
- None of the urban local bodies in any of the towns studied, reported that the poor sanitation condition is on account of shortage of funds. The main reason according to them is lack of proper planning, inadequate emphasis given for the implementation of rules and indifference of people and the representatives in giving priority to sanitation.

7. Recommendations

Replicating Good Practices

The systems for water supply and sanitation that exist in township of BHEL and GCF are noteworthy. The technological and the institutional system adopted by these townships are worth replicating for small and medium towns (at least). The study recommends that the system in both these townships be studied in their technical and economic feasibilities and use for replication in other cities.

Developing Demonstrative Processes

The water and sanitation scenario in urban areas suggest that it will be more meaningful and relevant to develop demonstrative processes related to: Planning for source development; Feasibility assessment; Institutional processes; Cost recoveries; and Performance appraisal

Advocacy

At a broader level two sets of issues are identified for advocacy:

- a) at the policy level that will affect all the areas of Madhya Pradesh. This includes issues related to:
 - Setting minimum norms for water and sanitation that each local body has to ensure to qualify as an institution of good governance.
 - Role of different institutions in ensuring the provisioning of services in water and sanitation. This should include the statement on the role of parastatal organisations like development authorities, housing boards etc.
 - Policy of urbanisation along with the policy related to slums and their entitlements.
 - Debate on the advantages on having a separate organisation like Jal Board for supplying services in water and sanitation.
- b) Issues related to specific city context
 - Level of awareness among the elected representatives regarding procedures,

processes and practices related to water and sanitation.

- Building the capacity of officials of the PHE cell and the elected representatives to be able to address the issues of water and sanitation in their respective areas.
- Solid and liquid waste disposal mechanisms that are context specific, locally relevant and environment friendly.
- Developing effective mechanisms for interaction between citizens and governance institutions.

Introduction

1.1 WaterAid India

WaterAid is an international NGO exclusively focused to ensure the provision of safe domestic water, sanitation and hygiene education to the world's poorest people. With its headquarters in United Kingdom, WaterAid works in 15 countries, mostly in Asia and Africa.

WaterAid India Programme started in 1986 with a dominant presence in the southern states of the country. With Country Programme office at Tiruchirapalli, WaterAid worked with more than 70 partner organisations in Tamil Nadu, Andhra Pradesh, Maharashtra, Orissa and Karnataka.

A review of the India Programme in 2002 underlined the commitment of WaterAid in developing methodologies that were able to set standards of good practice for water, sanitation and hygiene projects in these states. The demonstrated impacts in southern states gave confidence to WaterAid in India to focus towards the poorer states in the northern part of the country. As a strategic move the headquarters of the country programme was shifted to New Delhi to work closer with policy makers. Regional offices were opened in Bhopal and Bhubaneswar in 2002 to work closely with most vulnerable communities in Madhya Pradesh, Chhattisgarh, Uttar Pradesh, Orissa, Bihar and Jharkhand.

1.2 WaterAid India (West)

The WaterAid India (West) office is located at Bhopal and works in Madhya Pradesh, Chhattisgarh and Uttar Pradesh. The regional office is expected to work within the overall country strategic framework of intervening through integrated projects that combine water, sanitation and hygiene promotion to maximise benefits to poor communities.

WaterAid recognises that each context presents its own array of related issues that have to be addressed through a matrix of programmes that strategise interventions in terms of geographical and thematic targeting to maximise impact on vulnerable groups. Consequently each regional office is expected to identify and develop its operational strategy for the states where it is intervening. The WAI (West) in pursuance of this requirement commissioned a study to profile the State, Institutions and Policy Environment of Madhya Pradesh in 2005. The study outlined the state of water and sanitation in Madhya Pradesh and drew contours of issues that seemed relevant at the state level. The

state level study is to be followed with a field study in selected areas to deepen the understanding of the issues identified and also to assess whether there are other issues that are not reflected in the data at the state level but are nevertheless critical at the community level. The present study is the follow-up of the desk review and draws its methodology from the data presented in the earlier report.

1.3 Summary of Desk Review

The trends of urbanisation underline that:

- Madhya Pradesh is the sixth most urbanised state in the country.
- It is rapidly gaining an urban character with 26.6 per cent of the population residing in urban areas.
- The state is dominated by large number of small and medium towns with four urban centres with a heavy concentration of population. There are 26 towns accounting for 55.8 per cent of the population and the remaining 311 towns accounting for the remaining 44.2 per cent of the population.
- Madhya Pradesh is experiencing a higher growth rate of medium sized towns.
- 38.4 per cent of the urban population is below the poverty line (1999-00).

The state has modified its municipal laws to conform to the 74th constitutional amendment and the municipal bodies have the legal responsibility for the provision of water and sanitation in the state.

The data on management of water supply in urban areas indicate that the 337 urban local bodies in the state are primarily dependent on ground water to fulfill their water requirement. The current policy of the government is to go deeper or to go farther or both to cater to the incremental demand for water in urban areas. This not only increases the cost of water supply for the urban local body but also affects the water availability in the adjoining rural areas. The factors of regional variations in availability of water, location specific requirements of urban areas, growth rates in population of urban centres do not figure in either policy or plans of the state government. As a result, the best that the local bodies and the district administration are able to achieve is managing water scarcity crisis during summer season every year. There is no medium or long term strategy that addresses the issue of source sustainability.

The state government has initiated measures by modifying Land Development Rules to make

construction of rain water harvesting structures mandatory for plot size more than 250 sq m in the state. Till March 2004, the local bodies had granted building permission to 18,256 cases with provision of rain water harvesting structures.

93 per cent of the towns in the state have less than 70 litres per capita per day (LPCD) water available. The data related to supply of water indicates that 63 per cent of the urban centres receive water daily; 28 per cent towns receive water supply once in two days and 9 per cent towns receive water supply once in two or more days.

The water distribution system and water charges are under the control of the urban local body. In all the local bodies in the state the water charges are un-metered.

For slum settlements, there are no specific investments made for water distribution by the PHE Department. The local body connects the slums with the main pipeline and creates a spot source or invests in installing a hand pump in the vicinity. The water supplied is free and no charges are collected from people living in slums.

The census figures indicate a very poor coverage of urban population through tapped water source and inadequacies in proximity of source. Both these factors point towards the insufficiency of water availability and a high degree of dissatisfaction by the consumer. These factors also account for poor recovery of water charges by the urban local body.

The desk review looked at urban sanitation to include disposal mechanisms for liquid and solid waste and the prevalence of private latrines in the households.

With respect to liquid waste disposal the review found that none of the cities in Madhya Pradesh are fully covered by a sewerage system. Disposal through septic tanks is the widely used system and these tanks have been installed in most urban centres. However, only 11-13 per cent of the septic tanks are in working conditions. The larger cities are partially covered by a sewerage network but the waste water is not treated before being released in a river.

Despite state government claims there is wide prevalence of manual scavenging in different cities of the state.

76 per cent of the urban households in the state have the facility of being connected to either a closed or an open drain for waste water. The districts in the Bundelkhand region, namely, Damoh, Chhatarpur, Panna, Satna, and Rewa; and districts in the southern tribal belt namely, Shahdol, Sidhi, and Umariya have a high proportion (more than 35

per cent) of households who are not connected with drains for waste water.

Solid waste management had gained priority in urban areas consequent to the judgment of the Supreme Court. The State Pollution Control Board is the nodal agency for providing technical clearances to the schemes for solid waste management formed by respective local bodies. So far 116 bodies have received authorisation and 65 bodies have either land or have been allotted land for land-fill sites. The remaining local bodies are in the process of either identifying appropriate land or getting the land identified, allotted to them.

68 per cent of urban households have private latrines within the house. Among these 60 per cent of the houses have water closet latrines. The districts with higher proportion of households with private latrines are districts that have a high degree of urbanisation – Bhopal, Indore, Ratlam, Ujjain and Gwalior. The districts that have a poor coverage of any type of latrines are in the Bundelkhand region – Tikamgarh, Chhatarpur, Damoh, Panna, Satna, Rewa and Sidhi. The tribal districts in the southern part of the state too have a poor coverage of households with private latrines – Dindori, Umariya and Balaghat.

The institutional framework for supplying water and maintaining adequate standards of sanitation in urban areas in the state are defined in the state municipal act. The urban local bodies have been entrusted with the responsibility for water and sanitation. However, the services of functionaries of the state PHE Department have not been transferred to these bodies. The net result of this half-hearted decentralisation is that there are in effect three institutions – the urban local body, the PHE Department at the state level, and a section within the local body responsible for water and sanitation. The dual control over the PHE section within the local body dilutes the responsibility and accountability with respect to ensuring supply of water and maintenance of water installations in the city. During shortages the local body and PHE department trade charges on their respective inefficiencies.

The desk review identified the following issues in urban water and sanitation sector:

- There is inadequate supply of water in urban areas. All the urban centres face water crisis during summer months in all urban centres.
- The current strategy for providing incremental supply of water in the urban areas is not sustainable as it does not address the prime need for source sustainability.
- The regime of fixed charges for water is inequitable and also does not promote conservation from the side of the consumer.

- Need of urban poor not addressed.
- Lack of role clarity among different institutions responsible for water and sanitation in the state.
- Lack of institutional convergence in designing and implementation of water related schemes in urban areas.
- Untreated waste is released in surface water bodies due to absence of sewerage system in urban areas.
- Absence of system of segregating solid waste from the point of generation to safe disposal.
- Practice of manual scavenging still prevalent in the state despite claims to the contrary by the state government.

1.4 Field Study

The findings of the desk review identified issues based on concerns expressed by institutions responsible for supplying services in water and sanitation. The

people's issues and their expectations from the service providers did not figure in the desk review. For example, given the state of water crisis in urban areas what is the coping mechanism of the residents did not form part of the desk review. The desk review could identify issues that are systemic in nature and emphasised the need for looking in to urban WATSAN as a separate sub-sector.

The field research that forms the basis of the current exercise was conceived of as a primary level study with a purposive sampling bias. It aims to initiate a detailed inquiry into issues that have been identified during the desk review. It also addresses concerns of communities and individuals in water and sanitation in urban areas. The primary user of the file study research will be WaterAid India and the regional office will use the results of the study to develop programme interventions in Madhya Pradesh.

Methodology

2.1 Objectives of the Study

The objectives of the present study were decided mutually in consultation with WaterAid India regional office. The study was conducted with the objective to:

- (i) identify and assess the state of demand for and supply of water in towns and the strategies adopted by urban local bodies, in fulfilling these demands;
- (ii) identify and assess the state of demand for and supply of water in the slum areas of the towns and the systems adopted by urban local bodies in fulfilling this demand for water;
- (iii) assess the measures undertaken by the community/government for ensuring source sustainability for drinking water;
- (iv) identify the systems used by the service providers and service receivers for ensuring the quality of water;
- (v) identify the hygiene and sanitation system (private/community latrine, liquid waste disposal and solid waste management) of the town including the role of the local body and/or government department in operationalising the system;
- (vi) identify the systems of O&M, grievance handling on subjects of water and sanitation; and
- (vii) analyse the findings in the light of current policies and programmes of the government and non government agencies (if any).

The study is thus comprehensive in nature. It treats the issue of water from the point of view of source and the measures taken to ensure its sustainability, the demand and the supply system that have been established for water within the city. There is an inherent bias of the study in favour of the urban poor as it seeks to place special emphasis on whether the water requirements of the poor are being met as far as water and sanitation needs are concerned. The study takes the position where the urban consumer is treated as a client and his satisfaction in terms of availability, adequacy and quality of water forms the basis of inquiry to assess the ability of the urban local body to satisfy these needs. The term sanitation is used in the wider sense to include place for defecation, system for liquid and solid waste disposal in the city.

2.2 Research Question

The main research question for the study will be:

What is the state & status of water and sanitation in the urban areas selected for the study?

The term water includes water required for domestic consumption; and sanitation refers to disposal of human excreta, liquid waste and household solid waste. The term state has been used to reflect the present levels of demand and supply of water and sanitation in the household and the term status is used to make assessment of services in water and sanitation with respect to their adequacy and quality. The expression status has also been interpreted to take into account trends related to levels of and services for demand and supply at the village level.

The main research question has been broken down to include the following:

- (i) Demand for water (different types and purposes of demand; different sources of demand; quality of water demanded);
- (ii) Sources of water (where does the city get its water from and what is the sustainability of this source, how is source related to demand and the water supply system);
- (iii) Accessibility of water (how does the household fulfill its water requirement especially for the people living in slums and colonies not yet handed over to municipal body);
- (iv) Adequacy of water (quantity of water available to the household and the seasonal variations in this availability);
- (v) Water Quality (notions of water quality and the ability of the people to deal with issues of quality of water supplied to them);
- (vi) Institutional Issues (the institutions ability to cater to the needs for demand and quality for water and sanitation for people in cities; emergence and role of water markets; ability of institutions to recover the cost of water supply and the preparedness of the client to pay for cost of water); and
- (vii) Sanitation (prevalence of open defecation in cities, scope for community latrines; system for liquid and solid waste disposal in residential areas; system of collection and disposal of domestic, industrial and commercial garbage; and state of environmental sanitation in the city).

2.3 Scope of Study

The scope of the study is defined as follows:

- the theme that the study seeks to address is water and sanitation. Water including water demanded by different user groups in the city and sanitation including disposal of human excreta, liquid and solid waste disposal;
- the study area will be limited to the cities selected as per the sampling plan of the study

Table 2.1: Districts with Urban Population higher than the State Average

| District | Percentage Urban Population | Nagar Panchayat | Municipal Council | Municipal Corporation |
|-------------|-----------------------------|-----------------|-------------------|-----------------------|
| Bhopal | 80.53 | 1 | - | 1 |
| Indore | 71.57 | 9 | - | 1 |
| Gwalior | 60.33 | 4 | 1 | 1 |
| Jabalpur | 57.51 | 6 | 2 | 1 |
| Ujjain | 38.74 | 2 | 4 | 1 |
| Hoshangabad | 30.95 | 2 | 4 | - |
| Ratlam | 30.25 | 6 | 1 | 1 |
| Sagar | 29.25 | 4 | 5 | 1 |
| Neemuch | 27.88 | 7 | 1 | - |
| Dewas | 27.35 | 10 | - | 1 |
| East-Nimar | 26.95 | 5 | 1 | 1 |

- the assessment and the analysis will be guided by the needs of the primary audience of the study – WaterAid India regional office; and
- the study will generate primary level information through interviews and focus group discussions with identified groups and persons.

2.4 Sampling Plan

The current study adopted a purposive sampling plan for the selection of urban areas in the state.

Step 1: Selection of District

Madhya Pradesh has 26.4 per cent population living in urban areas. It was decided to take up districts where the proportion of urban population is more than the state average. This would ensure that the districts with large urban population would be selected for the study. Consequently a list of districts with per cent urban population higher than the state average and the type of urban local bodies is given in Table 2.1.

(a) Short listing of Districts

Urbanisation in MP has led to different class size of

towns. A district will have a town with more than 10 lakh population as well as a town with population less than 50 thousand. However the problems related to water and sanitation in the towns in the same district will vary considerably on account of its size. Thus it was decided to select those districts that have all the three types of urban local bodies within their area. This would facilitate the understanding of the systems and issues at each level of the Urban Local Body and the approach of the government towards it. To corroborate the findings it was necessary that the study is done in at least two districts. On this basis the following districts were short listed. (Table 2.2)

(b) Selection of Districts

Among the six districts short listed the selection of the two districts was as follows:

Jabalpur district was selected as it has the highest urban population and highest growth rate among the districts short listed. Jabalpur Corporation has a slum population of 10.05 per cent (Census 2001)

Ujjain district was selected as the second district for the study. The selection primarily had to make a

Table 2.2 List of Districts with all the three types of Urban Local Bodies and the Urban Population in the District and its Growth Rate

| District | Nagar Panchayat | Municipal Council | Municipal Corporation | Urban Population (in lakhs) | Urban Growth Rate (1991-01) |
|----------|-----------------|-------------------|-----------------------|-----------------------------|-----------------------------|
| Gwalior | 4 | 1 | 1 | 9.83 | 20.80% |
| Jabalpur | 6 | 2 | 1 | 12.46 | 23.54% |
| Ujjain | 2 | 4 | 1 | 6.62 | 21.15% |
| Ratlam | 6 | 1 | 1 | 3.67 | 18.62% |
| Sagar | 4 | 5 | 1 | 5.91 | 22.85% |
| Khandwa | 5 | 1 | 1 | 4.60 | 16.78% |

choice between Gwalior and Ujjain. In case of former it had a higher urban population whereas in case of the latter it had a higher growth rate. Preference was given to growth rate as it also exemplifies the pressure on provision of services in water and sanitation to the citizens. Moreover with 4 Municipal Councils and 2 Nagar Panchayats in Ujjain district as against 1 Municipal Council and 4 Nagar Panchayats in Gwalior, the former indicates a higher degree of urbanisation. Hence district Ujjain was preferred over Gwalior as the second district for the study.

Step 2: Selection of Cities

The selection of specific urban local body to be covered in the district was conducted in consultation with Department of Urban Development, Government of Madhya Pradesh. The criterion used by the department was the level of urbanisation in the Nagar Panchayat and Municipal Councils in the selected districts. The discussions with the department led to the selection of the following cities for the study:

Table 2.3 **Cities selected after consultation with Urban Department in the Districts Selected for the Study**

| District | Municipal Corporation | Municipal Council | Nagar Panchayat |
|----------|-----------------------|-------------------|-----------------|
| Ujjain | Ujjain | Badnagar | Tarana |
| Jabalpur | Jabalpur | Panagar | Shahpura |

Step 3: Selection of Specific Areas for Specific Focus

Bhopal and Indore are two million plus cities of the state. Indore Municipal Corporation has implemented innovative programmes like Slum Networking, Water Harvesting etc. Hence during discussions at the WAI Bhopal Office, it was decided to take up the study of these programmes undertaken up by the Indore Municipal Corporation.

The city of Bhopal was selected as it would represent the problems faced by large cities in the provision of water and sanitation services.

Thus, the following have been selected for the Phase III study:

Table 2.4 **List of Cities Selected for the Study**

| | |
|-----------------------|-------------------------------------|
| Municipal Corporation | Bhopal, Jabalpur, Ujjain and Indore |
| Municipal Council | Badnagar and Panagar |
| Nagar Panchayat | Tarana and Shahpura |

Step 4: Sampling within the City

Geographical: A map of the city was collected from the urban local body to (a) define the city limit and (b) to select the area for the field study. The latter was accomplished by selecting all the four geographical corners of the city as well as the central portion. The central portion of the city was defined as the original city settlement so that the 'old city' also gets covered during the survey.

The area that was selected through the above process was intensively studied in terms of all the users of water – residential (high, middle, low and slum settlements), commercial, and institutional groups. The elected representatives of the wards that were selected for the study were interviewed.

Problem and Good Area: The Urban Local Body was consulted to identify the areas within the city that are problem or good areas with respect to (a) water and (b) sanitation. If the suggested areas were not included in the sample drawn through geographical coverage then they were included as part of the sample.

Industrial: The study did not cover the small industrial units that are spread within the city. It relied on the demarcated industrial areas in the city selected for the survey.

Urban Villages: In case of Municipal Corporations, villages that have come within municipal limits have been selected for the study. This category has been classified as urban village in the present study.

For example at Jabalpur the following areas were selected for the study. (Table 2.5)

2.5 Method of Data Collection

2.5.1 Sources of Information

The study collected information from the respondents that either belonged to a government agency or were non governmental persons.

Primary Source – Non Government

The sources of information were grouped in terms of major users of water in the city. This led to the following major groups:

- (a) **Domestic Users:** This group included the residents of residential colonies (including slum settlements), the office bearers of residential societies, colonisers and real estate developers, and NGO representatives in the area.
- (b) **Institutional Users:** This group included educational institutions (schools and colleges), hostels, hotels and hospitals.

Table 2.5 Selection of Study Area for Jabalpur City

| Ward | Residential | Commercial | Institutional |
|--|---|---|--|
| Deen Dayal (23) | <ul style="list-style-type: none"> Deendayal Slum Sanchar Nagar Slum Behind Bhola Nagar Slum Chandal Bhata (Transport Nagar) Sai Colony (HB) Krishna Nagar (PB) Green City (PB) Manmohan Nagar (MC) ITI Colony (GC) PNB Colony (GC) Tri Murti Nagar (PB) Mado Taal (OC) | <ul style="list-style-type: none"> Naya Bazaar George Town Market | <ul style="list-style-type: none"> Anjuman Islamia Mayur Hotel Mahakaushal College Bus Stand |
| Garha (49) (Fluoride) | <ul style="list-style-type: none"> Bank Colony Koshta Mohalla (OC) Jhariya Mohalla Garha Bauli (OC) Garha Bazaar (OC) | <ul style="list-style-type: none"> Garha Bazaar | |
| Tripuri (57) (Fluoride) | <ul style="list-style-type: none"> Jain Temple Mohalla Devlal Pahari Colony Tripuri Basti | <ul style="list-style-type: none"> Tripuri Bazaar | <ul style="list-style-type: none"> Medical College |
| Cherital (12) | <ul style="list-style-type: none"> Vijay Nagar (PB) Shri Vihaar (PB) Survey of India Colony (GC) Kanchan Vihaar (PB) Rajiv Nagar Slum 90 Quarters (GC) Privident Colony State Bank Colony (GC) JDA Colony (MC) | <ul style="list-style-type: none"> Cheri taal market | <ul style="list-style-type: none"> Cheri taal Campus (school and hospital) Hotel in front of Cheri taal Campus Arhant Hostel Surya Hotel |
| Gwari Ghat (59) | <ul style="list-style-type: none"> Avadh Puri Colony (PB) Purani Basti Bhim Nagar (AB) Poli Pathar (AB) | <ul style="list-style-type: none"> Gwari Ghat (market, ashram and hotel) | <ul style="list-style-type: none"> Bus Stand |
| Rani Laxmi Bai (60) (Urban Village) | <ul style="list-style-type: none"> Temar village (6 mohallas) (Ayodhya Basti) Bitra village (10 mohallas) (Ayodhya Basti) | | |
| Rajiv Gandhi ward (24) (Poor Sanitation) | <ul style="list-style-type: none"> Muslim Mohalla (slum) Ganj Badhaiyya mohalla (slum) | <ul style="list-style-type: none"> Shiv Mandir | |
| Adhar Taal (40) | <ul style="list-style-type: none"> Ekta Colony (ex govt) Gayatri Colony (Harijan) Gujrati Mohalla (old residents) Jai Prakash Colony | <ul style="list-style-type: none"> Ashirwad market | <ul style="list-style-type: none"> Shivalaya Lodge Satyam Shivam Restaurant |
| Industrial Area | <ul style="list-style-type: none"> Rijhai Industrial Area Ranji Area Colonies | <ul style="list-style-type: none"> Tea stalls, hawkers | <ul style="list-style-type: none"> Sakshi Bhojnalaya Pal Restaurant Sonali Sweets |
| Hotels | <ul style="list-style-type: none"> Rishi Regency | | |
| Railway Station | <ul style="list-style-type: none"> Jabalpur Railway Station | | |

Note: The figures in bracket in column one are the ward numbers; PB= Private Builder; HB= Housing Board Colony; GC= Government Colony; MC= Municipal Corporation Colony; OC= Old City; AB= Ayodhya Basti

- (c) **Commercial Users:** The main markets of the city, the traders association, bus stand and railway station.
- (d) **Industry:** Industrial areas, industrial units, service providers of the industry constituted this group.

- (v) Councillors: Elected representatives of the local body
- (vi) Urban Local Body: Commissioner, PHE department, Zonal Office, Ward Office, DUDA representative

Primary Source – Government

The persons in government that were interviewed belonged to the following departments/agencies:

- (a) Urban Local Body (Elected Representatives)
- (b) Members of Mohalla samiti/ Ward samiti
- (c) Personnel in PHE department at the ULB
- (d) Personnel in PHE department at the district level
- (e) Personnel in Health department at the ULB
- (f) Representatives of Development Authorities and Housing Board
- (g) ULB officials at the zonal and ward office
- (h) Retired PHE officials

Secondary Sources

- (i) Documents of ULB's
- (ii) Relevant government reports and documents
- (iii) Study reports and other similar documents

2.5.2 Tools for Data Collection

(a) Individual Interviews

Interview schedules for the each of the groups identified above were developed to collect information. The following schedules were developed:

- (i) Domestic Users: Residential colony, Slum settlements
- (ii) Institutions: Hostels, Schools, Colleges, Hotels, Hospitals
- (iii) Commercial: Shopkeepers and Members of the Association
- (iv) Industry: Owner of the industry and office bearers of the Industrial Association

(b) Focus Group Discussions

Focus group discussions were held with residents of the colony and the slum settlement as well as with shopkeepers in the market.

(c) Observation

Semi-structured observation was carried out in all the areas that were selected for the study.

(d) Social Mapping

Colonies and markets were mapped to assess the spread of the area and location of water sources and community toilets.

(e) Historical Information

The history of the city was taken in discussion with older residents in all the cities selected for the study.

2.6 Training of Research Associates

Training of Research Associates for Bhopal, Jabalpur and Ujjain districts was conducted over two days. The training involved briefing the team about the institutional set up in urban areas, the issues related to water and sanitation in urban areas.

The second stage of training involved getting the team familiar with the schedules and their ability to undertake the survey. A gradual introduction to the schedules and their conduct in the field was undertaken followed by debriefing sessions to make the team competent to conduct individual interviews and focus group discussions.

Profile of Cities Selected for the Study

3.1 Demography

The demographic information of the cities selected for the study is given in Table 3.1. The table indicates that Bhopal has already achieved the status of million plus city and Jabalpur is fast achieving that distinction. These two cities also have a high growth rate and there is likelihood of their population increasing further in the next decade. Ujjain on the other hand has yet to cross the 5 lakh mark and has a low decadal growth rate.

As a region it is Jabalpur district that is revealing trends in higher urban growth rate than that of Ujjain. The smaller cities of Shahpura and Panagar in the district have a higher growth rate than the cities of Ujjain district.

The slum population of the Census pertains to cities with more than 50 thousand population. As a result the slum population of only Municipal Corporations is available. Among the corporations Bhopal indicates a low proportion of population living in slums as against Ujjain and Jabalpur that have more than one-fourth of their population living in slums.

3.2 Brief History

Bhopal: Bhopal was founded by the Parmara King Bhoj (1000–1055), who had his capital at Dhar. The city was originally known as Bhojpal after him. Bhoj is said to have constructed the Upper Lake of Bhopal.

The state of Bhopal was established in 1724 by the Afghan Sardar Dost Mohammed Khan, who was a commander in the Mughal army posted at Mangalgarh

(which now lies to the north of modern Bhopal). After the death of the last Gond queen, Dost Mohammed Khan seized the little Gond Kingdom and established his capital 10 km away from modern Bhopal, at Jagdishpur (called Islamnagar). He built a small fort and some palaces at Islamnagar and later built a bigger fort situated on the northern bank of the Upper Lake. He named this new fort as Fatehgarh. Later the capital was shifted to the current city of Bhopal. Since then the city of Bhopal has grown with Upper Lake as its centre of gravity.

Bhopal was able to retain its independence during the expanding phase of Marathas and later became a princely state under the British rule as part of Central India Agency. It was administered by an agent of the British Governor-General of India.

“Majlis-e-Intezamia” was the name of the first municipal body, which came into being in 1907 in the erstwhile Bhopal estate. The first city survey was conducted in 1916 after the enactment of Municipal Act. The Municipal Board was constituted for the first time in 1952. Later on, the status of Municipal Board was upgraded to Municipal Council. In 1983, Bhopal Municipal Council got the status of Municipal Corporation, with total 56 wards (now 69). Upto 1956 the area under Bhopal municipal limit was very small, but after that a few more surrounding villages were added to it. The total area under Bhopal municipal limit reached 71.23 sq kms by 1975. At present the total area under Bhopal Municipal Corporation is 285 sq kms.

Jabalpur: Jabalpur was part of the Gond kingdom until it fell to Maratha rule in 1780. To commemorate their

Table 3.1 Demographic Profile of Cities Selected for the Survey

| City | Total Population (2001)* | Per cent Decadal Growth (1991-01)* | No. of Wards | Population Per Ward | Gandi Basti# (No.) | Per cent Slum Population* |
|----------|--------------------------|------------------------------------|--------------|---------------------|--------------------|---------------------------|
| Bhopal | 14,33,875 | 34.92 | 69 | 20780 | 209 | 8.81 |
| Jabalpur | 9,51,469 | 28.24 | 60 | 15857 | 117 | 28.95 |
| Ujjain | 4,30,427 | 18.68 | 54 | 7970 | 113 | 28.15 |
| Badnagar | 34,065 | 7.97 | 18 | 1892 | 61 | NE |
| Panagar | 25,143 | 17.16 | 15 | 1676 | NA | NE |
| Tarana | 25,000 | 8.28 | 15 | 1666 | NA | NE |
| Shahpura | 11,961 | 20.71 | 15 | 797 | NA | NE |

* Source= Census 2001; # Source= Urban Local Body; NA = Not Available; NE = Not Enumerated

rule the Gond rulers used to get a pond constructed in their name, for example Rani Tal (by Rani Durgawati), Sangram Sagar (by Sangram Shah), Cheri Tal (by maid of Durgawati) etc. At the time of independence 52 such ponds were reported in and around the present city of Jabalpur. At present however only 13 such ponds are active.

Jabalpur came under British rule in 1817 with the collapse of Maratha administration. The British established a cantonment over an area of 445 acres that was later increased to 524 acres with the addition of second regiment in 1831 and shifting of the capital of CP and Berar from Sagar to Jabalpur in 1861. The administration of the town was the responsibility of a provisional government that was headed by a Maratha in 1818. The town faced Bundela revolt in 1842 and later in the Sepoy mutiny 1857. In 1863 Royal Commission suggested measures for health, sanitation, civic amenities and improvements in educational facilities. The Municipal Body of Jabalpur was established in 1864 and the Lucknow Municipal Committee Act was brought into force. Later the Punjab Municipal Committee Act was brought into force in the city. As the concept and mechanisms for local self government evolved during the British rule different acts were applied and continued to be in force till India gained its independence. The Jabalpur Municipal Corporation came into existence in June 1950.

Ujjain: The early history of Ujjain is lost in the midst of antiquity. As early as the time of the Aryan settlers, Ujjain seems to have acquired importance. By the 6th century B.C. Avanti with its capital at Ujjaini, is mentioned in Buddhist literature as one of the four great powers along with Vatsa, Kosala and Magadha.

Ujjain lay on the main trade route between North India and Deccan going from Mathura via Ujjain to Mahismati (Maheshwar) on the Narmada, and on to Paithan on the Godavari. An account of an unknown Greek merchant who made a voyage to India in the second half of the first century AD talks of a city called Ozene to the east of Barygaza (Broach) which fed commodities of trade like onyx, porcelain, fine muslin and quantities of ordinary cottons, spikenard etc to this important port and to other parts of India.

During the 9th to 12th centuries, the Paramaras were identified with Ujjain. The last Paramara ruler was captured alive by the Sultans of Mandu, and Ujjain

passed into the hands of the Muslims. The tide of destruction triggered by Iltutmish's invasion was first stemmed by Baz Bahadur of Mandu and later by Akbar. Maharaja Sawai Jai Singh was made the Governor of Malwa, a great scholar of astronomy who had the observatory at Ujjain reconstructed and built several temples.

At the beginning of the 17th century, Ujjain and Malwa went through another period of siege and invasion at the hands of the Marathas, who gradually captured the entire region. Ujjain finally passed into the hands of the Scindias in 1750 and until 1810, when Daulat Rao Scindia founded his new capital at Gwalior, it was the chief town of his dominions. The shifting of the capital led to a decline in the commercial importance of Ujjain. A considerable volume of trade mainly with Bombay existed in cotton, grain and opium during the British Indian period.

There is much to demonstrate that in the perspective of India's long history, Ujjain enjoyed great importance in the battle for the empire and the constant struggle for supremacy. Political importance was compounded by the economic factor of Ujjain being situated on the main artery of trade between the North, the South and the West.

3.3 Master Plan

Bhopal: The Master Plan for Bhopal was approved in August 1975 and the Bhopal Development Authority was designated as the implementing agency for the Plan. The Plan was in operation till 1991 and since then it has been reviewed and approved in 1995 and was in force till 2005.

Jabalpur: The first Master Plan for Jabalpur was approved in October 1977 and was in operation till 1991. This Master Plan for the city was reviewed and has been approved in 1998 was operational till 2005. The Jabalpur Development Authority has been designated as the implementing agency of the Master Plan by the state government.

Ujjain: Ujjain's Master Plan was approved in October 1975 and was in force till 1991. At present the Master Plan is under review.

The Master Plans for the remaining selected cities, namely Badnagar and Tarana in Ujjain district and Panagar and Shahpura in Jabalpur district have not been prepared so far.

Water

4.1 Water Source

The issue of water source for the city covered by the study includes:

- the water source used by the municipal body to provide water to the households for domestic use, commercial and industrial use; and
- the water source that each user of water develops for itself as a private source of water.

Municipal Body

The historical water sources for the city and the current sources of water used by the municipal body are given in Table 4.1.

The cities historically have been dependent on surface water either through rivers or through storage of surface water through ponds.

Table 4.1 Sources of Water in Cities Selected for the Study

| City | Historical Sources of Water for the city | Sources of Water currently used by Municipal Body |
|---------------------|--|--|
| Bhopal | Upper Lake Dugwells | Upper Lake Kolar Dam Tubewell Handpump |
| Ujjain | Kshipra River Dugwells | Gambhir Dam Undasa Dam Sahebkhedi Dam Tubewell Handpump |
| Jabalpur | Local Ponds Dugwells | Pariyat (and Phagua) Tank Narmada River Khandari (and Gaur) Tank Tubewell Handpump |
| Badnagar (Ujjain) | Chamla River Dugwells | Dam Tubewell Handpump |
| Panagar (Jabalpur) | Local Ponds Dugwells | Tubewell Handpump |
| Tarana (Ujjain) | Kali Sindh river Pond built by Holkars Seasonal river Dugwells | Dam Tubewell Handpump |
| Shahpura (Jabalpur) | Local Ponds Dugwells | Tubewell Handpump |

Jabalpur: Different rulers constructed ponds at different places within their kingdom to commemorate their regime. As a result, the human settlements in the region had been dependent on water from ponds to fulfill their different water requirements. As the settlements grew in size additional ponds were constructed to fulfill incremental needs of water for these habitations. The trend at present in the region is to exploit more of ground water source – in case of big as well as smaller cities. The erstwhile ponds are now getting land-filled and their land use is gradually changing to commercial or residential purpose. For example, there were 52 ponds in and around Jabalpur city. At present only 13 are active and another 13 are in the process of getting dry. The remaining have already been filled and different construction activity has been undertaken on the area (colony, stadium, market etc). Similar situation was also observed at Panagar and Shahpura cities in the district. On inquiring it was found out that the reason lies in the haphazard way in which the law relating to transfer of ponds to the state was implemented. As the Mahakaushal region was merged in the state of Madhya Pradesh, the water bodies were to be transferred to the state. The owners were to be compensated for the transfer of the resource. However, due to corruption and inadequacies in compensation the water bodies remained in the private domain and as the shortage of land occurred the land prices shot up and the owners of the water bodies realised that it would pay them more to change the land use and consequently resorted to measures that led to the drying up of the water bodies in the region.

Ujjain: Ujjain city had always been drawing its water from Kshipra river and till recent past (1984) the city's water requirements were entirely met by the river. The main tributary of Kshipra is river Khan that flows from Indore. The pollution level in Khan river increased with increase in population and industrial activity in Indore. This adversely affected the quality of water of Kshipra. In early 80s the decision was taken to shift the water source for Ujjain from Kshipra to Gambhir dam. Secondly, the water requirement of one of the industries Shri Synthetics at Ujjain was met from river Undasa. The same source was used to supply water to a portion of the city that has been connected to the pipeline from Undasa.

The other cities in Ujjain district, Badnagar and Tarana, used to fulfill their water requirements from the river near which the settlements grew. Over a period the

water available in these rivers decreased as a result of which these cities have increased their dependence on ground water sources.

Bhopal: At Bhopal the Upper Lake has been the centre of gravity around which the settlements grew over a period of time. The lake was and still is the major source of water supply for the city. However of late a portion of the city is getting its water from the Kolar Dam and plans are underway to get water from river Narmada that is 40 kms away from the city.

Private Sources

In addition to the sources of water tapped by municipal bodies the water users in the city have also developed their own sources. The water sources in the private domain largely relate to exploitation of ground water sources and sub-surface sources through the dug wells (Table 4.2)

The private sources of water supply for the commercial/industrial and institutional users are mainly ground water through tubewells in all the cities surveyed.

The table underlines the fact that exploitation of ground water through tubewells has become the major source of water for most of the users in the domestic sector. The number of tubewells in residential colonies varies, based on the economic capacity of the residents. In some cases the study found 54 tubewells in an area of one sq km in Bhopal (Laxman Nagar). At the same time it needs to be pointed out that the

Table 4.2 Sources of Water in Private Domain in Cities Selected for the Study

| City | Domestic Users | Commercial and Industrial Users | Institutional Users |
|------------------------|---------------------|---------------------------------|---------------------|
| Bhopal | Tubewell Dugwell | Tubewell | Tubewell |
| Ujjain | Tubewell Dugwell | Tubewell Dugwell | Tubewell |
| Jabalpur | Tubewell Dugwell | Tubewell | Tubewell |
| Badnagar (Ujjain) | Tubewell Dugwell | | Tubewell |
| Panagar (Jabalpur) | Tubewell Dugwell | Handpump | Tubewell |
| Tarana (Ujjain) | Tubewell Dugwell | | Tubewell |
| Shahpura (Jabalpur) | Tubewell Dugwell | Tubewell | Tubewell |

study did not find any of the slum settlements in any of the cities developing their own (private) source of water. They rely only and only on the community sources of water either supplied through the community taps or handpumps.

The discussions in the domestic sector with households that have installed their own tubewells revealed the following reasons that prompted them to develop their own source of water:

- the water available from the municipal source is not regular, especially during summer season;
- adequate quantity of water is not available from the municipal source;
- the house is not connected with municipal source, because the colony developed by the coloniser/housing board has not been handed over to the municipal body; and
- having a private source of water provides a sense of security to the household.

The critical factors that prompted growth in private sources of water are the lack of faith of the citizens in the urban local body regarding their ability and the capacity to supply regular and sufficient quantities of water in all seasons. This is reinforced by the fact that people use pumps in the pipeline to draw more water within the stipulated time.

Issues in Sources of Water

Seasonality

The availability of water in the sources used by the municipal body and those in the private domain have reported a strong seasonality factor that affects in the availability of water from the source. In all the cities the water source was either dry or came under severe stress during the drought years of 2002-03. The seasonality factor underlines the need for a comprehensive planning process that takes into account drought years and develops buffers of water stock that can be used during times of water stress.

Jurisdiction

The stored water sources used by the municipal bodies are not within their jurisdictional control. The ownership of these sources is either with the state government (Upper Lake) or Water Resources Department (Gambhir, Kolar, Pariyat, Khandari, Undasa and Sahebkhedi Dam). The rivers are within the jurisdictional control of state government. There does not seem to be a cost benefit analysis at the local body level of the strategy to secure water from sources that are outside the jurisdictional control of the municipal body. The conflicts between the municipal body and the Water Resource Department are frequent as the department exercises control in the release of water. During times of water stress municipal bodies have to often make representations

to the state government to intervene and release their quota or additional water from these dams.

This issue of jurisdictional control of the municipal bodies was addressed to the municipal officials of the three Corporations. In their opinion the need to access water sources outside the jurisdictional area of the city is an inevitability that cannot be questioned at present. However a series of articles carried out by The Hindustan Times (Bhopal Edition) dated 8, 9 and 10 June 2005 questioned the feasibility of getting Narmada water for Bhopal. According to these articles “Bhopal Municipal Corporation has adequate resources to supply more than 65 MGD of water in case there is sufficient water stored in the city reservoirs. If equally distributed 20 lakh people could get 30 gallons of water per day from these reservoirs.” Quoting the statistics released by the Bhopal Municipal Corporation the article stresses that “there is no need of supply of water from Narmada”.

The study team discussed the issue of the trend of going farther for water sources by the municipal bodies with a number of informed persons to assess the reasons for this strategy. The reasons given were:

- If the water source is outside the jurisdictional control of the municipal body it will not be responsible for nor will it have to spend funds for its maintenance. The local body comes to the agency as a client and makes payment for the water that it lifts for the city.
- The initial identification and feasibilities are made by the engineers of the PHE department and not by the engineers of the municipal body. The PHE department is not a stakeholder for water in the city. It comes as a technical agency to solve a given problem and the issue of jurisdictional control of the municipal body is not important for them.
- There is shortage of technical and trained staff at the municipal body level to prepare schemes that are within the control of the urban local body.
- The schemes prepared by PHE department focus more on the distribution aspect than on the source development and its sustainability.
- It will pay more to the municipal body to sell the land and/or earn through rental income than create a water body and generate revenue through water tax. Hence the focus of the municipal body is on land use that can maximise its income rather than think of land use that can improve environmental resources within its jurisdiction.

Nevertheless the issue of jurisdictional control of the municipal body has been recognised by informed citizens and they did express their concern over the fact that drawing water from far off sources will have long term consequences for the

municipal body that can affect its ability to tap water from these sources.

Competitive Uses of Water

The surface water reservoirs that are being accessed by the municipal bodies are under competitive uses: irrigation, domestic water requirement for adjoining rural areas, fishing (in all cases); and national park, recreational use and water sports in case of Upper Lake of Bhopal. These competitive uses of water represent potential areas of conflict between the water that is drawn by the municipal body and other demands for water. Cases of conflict have been reported at:

- Badnagar: irrigation vs water for city
- Tarana: irrigation vs water for city
- Bhopal: irrigation vs water for city; recreational vs water for city
- Jabalpur: irrigation vs water for city

The main conflict thus is between need of water for livelihood (irrigation) and the demand of water for the city. The decreasing trend of water availability in reservoirs indicates that there is likelihood of rise in conflicts between the water requirement for city and water for livelihood purposes.

Badnagar

Badnagar draws its water from Chamla reservoir throughout the year. The farmers near the reservoir also draw water for irrigation from the dam. Every year by January the farmers are asked not to draw any more water or else the water for the city will not be available during the summer months. However farmers do draw water from the dam that often leads to conflict between the Municipal Council and the farmers.

In 2005 one diesel pump was confiscated and an FIR was lodged against the farmers who were found to be drawing water from the dam. Since the Council does not have the power to stop the farmers from using the water they have to depend on the Sub Divisional Magistrate to enforce the prohibition. According to the SDM this role is to be played by the Municipal Council of Badnagar. The issue is snowballing and might lead to a higher level of conflict between the Municipal Council and the farmers.

The issue is the need for a comprehensive approach to planning for the development and use of water source that is able to take competing demands for water into account. This will involve use of sophisticated tools related to developing budgets for different uses of water and also creating institutional mechanisms where competing stakeholders are able to negotiate quantum of water use at common platforms.

Strategy for Source Development

As is evident from Table 4.1 municipal bodies adopt a strategy for drawing water from multiple sources – surface water, sub-surface water and ground water. However the location of development of ground water sources by the local body indicates lack of a coherent strategy in developing these sources for the city:

- the tubewells have been installed in the low lying as well as upper regions of the city (all cities);
- tubewells have been installed in and around colonies that are getting water supply from municipal network (all cities);
- tubewells are providing water directly to the pipelines that provided water to households without treatment (all cities);
- as the tubewells get dry a new one is installed within the vicinity without giving cognisance to their recharging structures (all cities);
- colonisers (including Development Authorities and Housing Board) provide water from tubewells to the residents of the colony until the colony is handed over to the municipal body (this has happened for 30 years in some cases) (all cities);
- even after the colonies have been handed over to the municipal body the residents continue to get water from the tubewell (all cities);
- industries are allowed to exploit ground water only on payment of royalty but it was reported to the study that there is rampant exploitation of ground water in industrial areas and in most cases the units are not paying any royalty (Govindpura, Bhopal); and
- ability to draw water from tubewells is directly dependent on the quantity and quality of electricity available to the municipal body. The ability of the body to pay electricity bills also

Badnagar

Badnagar Municipal Council gets its water from the reservoir from the dam of Chamla river. Till 1984-85 this river used to have a perennial flow of water. However, of late the water in the reservoir is not sufficient to cater to the water requirements of the city. The proposal to increase the height of the dam has been rejected as it had been increased once in 1971. During the summer months the municipal council takes over the borewells in the vicinity of the dam and lifts water directly from these wells to the filtration plant by using the generator. The water supplied is not properly treated as a result of which there is a peculiar odour in the water during these months. This is despite the fact that there are 33 tubewells and 42 handpumps (32 functioning well) that are also used to supply water to a population of 34065 persons. In addition the Council has a pending bill of Rs 30 lakh on account of electricity charges that they have incurred to supply water to the city.

affect its ability to get electricity at the right time to use tubewell (Badnagar, Ujjain).

Using natural topography and natural drainage lines for locating tubewells and making the best use of ground water with minimum cost of energy should form some of the basic factors for developing a strategy for ground water exploitation in cities. Moreover, the municipal body should also plan for and promote use of water harvesting structures, both in public and private domain given the number of tubewells owned by private persons, so that a regular stream of recharging of tubewells is installed in the cities.

Master Plan

The three big cities covered by the study have had Master Plans for the past 30 years now. The first Master Plan of these cities have been reviewed and updated. A perusal of the Master Plan of these cities reveals that the plan does not devote more than a page to the issue of water supply in the city. This page documents the existing water sources and estimates the water requirement for domestic purpose during the planning period. The Master Plans give in quite detail the land use of different sections of the city. Of the different land uses a water body does not appear as one of the possible land uses in any of the Master Plans.

It needs to be pointed out that the Master Plan is titled as the Development Plan of the city. It is indeed sad that a Master Plan for water does not form part of this plan. Since the growth of the city is expected to be governed by the land use defined in the plan it would only be logical that this plan also reflects on the possible sources of water that the municipal body can access to fulfill its incremental demand for water as the city grows over a period of time.

4.2 Water Supply and Accessibility

The issue of water supply and accessibility in urban areas relate to the water distribution systems that have been installed in the city and the ability of different persons to access water through this system. There are two sets of data that have been used to assess the situation in urban areas selected for the study. The first set of data relates to the Census 2001 that provides information on different sources of water that are used by the households. The second set of data has been generated from the field study. This section will first analyse these two sets of data and then address the issues related to water supply and accessibility.

Census Data

The Census data for water sources is at two levels: one, the source from where the households procure water for a greater part of the year and second, the

distance at which this source is located. The latter is classified as within the premises, near the premises (within 100 m) and away from the premises (more than 100 m). Based on these parameters the data for the cities selected for the study is given in Table 4.3, 4.4 and 4.5 below.

Table 4.3 reveals that more than four-fifth of households in Bhopal, Ujjain, Panagar and Badnagar are getting tapped water for a greater part of the year.

In Jabalpur almost three-fourth of households get water from taps where as at Shahpura the number of households having access to tap water are 70 per cent and at Tarana such households are 45 per cent.

Access to tap water implies coverage of households to the formal supply line of water in the city. The census data for the selected cities thus indicates an impressive coverage of households to the formal water supply system of the city.

Table 4.3 Sources of Water for the Households in the Cities Selected for the Study

| Sources of Water | | Cities Selected for the Study | | | | | | |
|------------------|----|-------------------------------|----------|--------|---------|----------|--------|----------|
| | | Bhopal | Jabalpur | Ujjain | Panagar | Badnagar | Tarana | Shahpura |
| Tap | No | 222064 | 124412 | 64304 | 3792 | 4477 | 1560 | 1306 |
| | % | 83 | 73 | 87 | 83 | 82 | 45 | 60 |
| Handpump | No | 21069 | 23732 | 4359 | 529 | 313 | 1516 | 643 |
| | % | 8 | 14 | 6 | 12 | 6 | 44 | 29 |
| Tubewell | No | 19040 | 10672 | 1695 | 23 | 606 | 270 | 199 |
| | % | 7 | 6 | 2 | 1 | 11 | 8 | 9 |
| Dugwell | No | 3130 | 8318 | 2691 | 196 | 51 | 47 | 25 |
| | % | 1 | 5 | 4 | 4 | 1 | 1 | 1 |
| Others | No | 3468 | 2219 | 548 | 3 | 31 | 47 | 9 |
| | % | 1 | 1 | 1 | 0 | 1 | 1 | 0 |
| Total Households | No | 268771 | 169353 | 73597 | 4543 | 5478 | 3440 | 2182 |
| | % | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

Table 4.4 Location of Water Source for the Households in the Cities Selected for the Study

| City | Total Households | Location | | | |
|----------|------------------|-----------------|---------------|--------|--------|
| | | Within Premises | Near Premises | Away | |
| Bhopal | | 268,771 | 155,230 | 80,279 | 33,262 |
| | % | 100 | 58 | 30 | 12 |
| Jabalpur | | 169,353 | 86,609 | 52,560 | 30,184 |
| | % | 100 | 51 | 31 | 18 |
| Ujjain | | 73,597 | 52,837 | 15,348 | 5,412 |
| | % | 100 | 72 | 21 | 7 |
| Panagar | | 4,543 | 1,962 | 2,039 | 542 |
| | % | 100 | 43 | 45 | 12 |
| Badnagar | | 5,478 | 3,602 | 1,129 | 747 |
| | % | 100 | 66 | 21 | 14 |
| Tarana | | 3,440 | 1,343 | 1,407 | 690 |
| | % | 100 | 39 | 41 | 20 |
| Shahpura | | 2,182 | 985 | 943 | 254 |
| | % | 100 | 45 | 43 | 12 |

The other important source of water for the households not connected by tap water supply is the handpump. At Tarana and Shahpura where the tap water coverage is low, 44 and 29 per cent of the households get their water from the handpumps, respectively. Tubewells and dugwells appear as sources of water that supplement the tap water and handpumps for the remaining part of the city. The other sources of water include water from ponds, tanks or rivers and forms a small proportion of households in the selected cities.

With respect to the distance, that the persons drawing water for the household has to travel to access the water source, the Census data reveals that less than one-fifth of the households have to travel a distance of more than 100 m to access the water source. For the remaining persons drawing water for the household, the water is available either within the premises or is located at a distance that is less than 100 meters from the house.

The households that do not have the water source within their premises imply that these households

Table 4.5 Location of Water Source with respect to Source of Water

| City | Location | Sources of Water | | | | |
|----------|-------------------|------------------|----------|----------|-------|--------|
| | | Tap | Handpump | Tubewell | Well | Others |
| Bhopal | Total Households | 222,064 | 21,069 | 19,040 | 3,130 | 3,468 |
| | % Within Premises | 61 | 20 | 76 | 28 | 7 |
| | % Near Premises | 30 | 42 | 12 | 32 | 27 |
| | % Away | 9 | 38 | 12 | 39 | 66 |
| Jabalpur | Total Households | 124,412 | 23,732 | 10,672 | 8,318 | 2,219 |
| | % Within Premises | 52 | 36 | 73 | 59 | 11 |
| | % Near Premises | 32 | 36 | 17 | 26 | 19 |
| | % Away | 16 | 28 | 10 | 15 | 69 |
| Ujjain | Total Households | 64,304 | 4,359 | 1,695 | 2,691 | 548 |
| | % Within Premises | 77 | 10 | 71 | 61 | 3 |
| | % Near Premises | 18 | 61 | 20 | 22 | 34 |
| | % Away | 5 | 30 | 9 | 16 | 63 |
| Panagar | Total Households | 3,792 | 529 | 23 | 196 | 3 |
| | % Within Premises | 42 | 53 | 39 | 51 | 33 |
| | % Near Premises | 46 | 41 | 26 | 39 | 67 |
| | % Away | 13 | 6 | 35 | 10 | 0 |
| Badnagar | Total Households | 4,477 | 313 | 606 | 51 | 31 |
| | % Within Premises | 73 | 10 | 48 | 14 | 10 |
| | % Near Premises | 18 | 46 | 24 | 47 | 23 |
| | % Away | 9 | 44 | 28 | 39 | 68 |
| Tarana | Total Households | 1,560 | 1,516 | 270 | 47 | 47 |
| | % Within Premises | 35 | 44 | 39 | 53 | 0 |
| | % Near Premises | 47 | 38 | 14 | 45 | 57 |
| | % Away | 18 | 17 | 47 | 2 | 43 |
| Shahpura | Total Households | 1,306 | 643 | 199 | 25 | 9 |
| | % Within Premises | 47 | 40 | 57 | 20 | 11 |
| | % Near Premises | 47 | 45 | 17 | 20 | 44 |
| | % Away | 6 | 16 | 26 | 60 | 44 |

have to procure water from a community source. From this perspective all the cities show an average coverage of households (maximum Ujjain 72 per cent followed by Badnagar 66 per cent) that have an assured supply of water as the source is located within their premises. These are the households that represent assured accessibility to the water source.

The sources of water that are located within the premises or outside the premises are given in Table 4.5. The table reveals an interesting picture. In the larger cities of Bhopal, Jabalpur and Ujjain taps, tubewells and dugwells are generally located within the premises whereas handpumps and other sources of water are located outside the premises. In case of small and medium cities larger proportion of households access water from taps that are located outside their premises (except Badnagar). The major sources of water that are located within the premises of households in the cities are handpump and dugwell (Panagar and Tarana), handpump and tubewell (Shahpura) and tubewell (Badnagar).

The Census data fails to provide the vital clues that are critical to determine the nature of accessibility of the households to the water source. Census methodology does not distinguish between tap as a private connection and tap as a community connection. Secondly, the data also does not provide the number of taps so that population density per tap can be calculated and the pressure of accessing water from tap can be assessed. Thirdly, the tendency to assume that households get water from one major source throughout the year does not conform to the field observation. Even during the course of the year households depend on more than one source of water. This fact is missed out in the Census as it defines and assumes one water source for the household.

Field Data

The water supply system in a city includes the pipes to draw water from the source, process of treatment of water, supplying water to the users through network of main and subsidiary pipelines to the point where the user is located (see Diagram of Bhopal). The user is then responsible to connect his private pipe line from the municipal line after making payment to the municipal body. The payment for the connection is based on the diameter of the pipe that the user chooses to install and on the type of user (see Box).

(a) Filtration Plant

Filtration plants have been installed where the water is drawn from a surface source – dams, ponds or reservoir. In cases where the ground water is drawn it is directly put into the pipeline for supply. This water does not go through the process of filtration/

treatment. On inquiring from the PHE personnel in the urban local body the team was told that the ground water is of good quality and need not be treated (*yeh to ground water hai isme contamination nahin hota hai*).

Filtration plants in the cities are now more than 50 years old (Jabalpur has a system designed by the British that is more than 100 years old). These plants have outlived their lives and the technology needs upgradation.

(b) Valve System

The water supply lines are manually operated and require a Valve Man to open/close the supply to a particular area. This involves a person going through a route at a particular time of the day to provide water to the colonies. What is commendable is that the valve men keep to their daily schedule and operate the lines on a defined time of the day. However, the current technology has reached levels where manual operation of valves is not required. The valves can be centrally controlled and operated through electronic medium. This would ensure equity and enable the operator to control the pressure of distribution.

The Valve Man is appointed at the zonal office level in the corporation and at the council level in other local bodies. For example in Bhopal there are seven posts of Valve Man sanctioned for each zonal office that looks after seven wards of the corporation. In case citizens have any grievance related to water pipelines they have to register their complaint at the zonal office level even though there is a ward office of the corporation.

Water Connection Charges in Bhopal

In addition to the charges for application (Rs 20) that is paid by all categories of users the connection charges for domestic users is based on the diameter of the pipe: half-inch (Rs 3000); three-fourth inch (Rs 5000); one inch (Rs 12000); one and a half inch (Rs 25000) and two inch (Rs 50000). Based on the diameter the domestic users also pay connection/pit charge that varies between Rs 300 to Rs 2000 (based on diameter).

The non-domestic users are divided into three categories:

- (a) small hotels, restaurants, ice cream parlours, beauty parlors etc (only half inch diameter allowed for Rs 8000)
- (b) shopping complexes and builders, offices etc (only half inch diameter allowed for Rs 15000)
- (c) nursing homes, clinics, commercial and industrial units (charge that varies between Rs 10000 to Rs 50000 based on diameter of the pipe)

(c) Distribution with and without OHT

The water supply systems of the cities selected under the study were of two types:

- Water supply system through the overhead tank
- Water supply system without the overhead tank

Both the systems exist within the same city and are followed for supplying water to different areas of the city (see Box on Ujjain and Shahpura).

(d) Colonies

The colonies here refer to the colonies that have been developed by the Development Authority, Housing Board and the private builders.

The study found out that the colonisers develop their own source of water (tubewell) and supply water to the residents. They normally do not apply for connection from the municipal source. Neither do they pay any royalty charge to the municipal body for drawing ground water and selling it to the residents. The charges paid by the residents are the same as that charged by the municipal authorities (if Bhopal Municipal Corporation is charging Rs 150 per household the developers also charged Rs 150. When the Corporation decreased its charges to Rs 60 the developers also decreased their charges). The money thus collected by the colonisers are appropriated and

Ujjain

Ujjain has 73597 households with 25851 tap connections. There are 364 borewells and 19 overhead tanks and the 20th one is under construction with 64.5 lakh gallon capacity that cater to the water consumption of 17978 lakh litres per day.

Each of the overhead tanks houses a PHE office of the Corporation below the tank. During interviews with the PHE officials the study found out that they were not aware of the housing colonies that are being serviced by their tank. Their sole concern was to ensure that water is pumped into these tanks and released at the appropriate time. The second concern was with respect to ensuring regular cleaning of the tank. The information related to service area of the tank is available only at the Corporation level.

Shahpura

There are two overhead tanks at Shahpura with installed capacity of 2.86 and 3.20 lakh litres respectively. Together these tanks serve water to 9 wards and to two wards partially. There are two tubewells attached with each of the tank that take 8 and 10 hours of continuous running for the tank to be filled completely. The remaining three wards are served by drawing water from three tubewells and supplying directly to the households. The electricity bill of the Nagar Panchayat is Rs 35,000 per month.

used by them. According to the colonisers the profits will be deposited to the municipal body at the time the colony is handed over to them.

The second issue is that of the distance between the water pipeline and the sewage pipeline. The colonisers have no defined standards for the distance of separation between the two. In the year 2002 there was a leakage between the sewage and water pipeline from the borewell in Ayodhya nagar colony in Bhopal. It resulted in spread of cholera leading to deaths. The Government medical team then stayed there for a month.

(e) Operation & Maintenance

The water supply schemes in all cases are designed and implemented by the PHE department of the state government. Once the scheme is complete it is handed over to the municipal authority which is then responsible for its operation and maintenance (O&M). The Corporations are able to recover only 20-30 per cent of the cost and Councils and Nagar Panchayat are able to recover 40-80 per cent of their costs so it becomes difficult for the municipal bodies to take comprehensive and annual maintenance of the supply pipelines. The O&M at present is a trouble shooting exercise and is undertaken to avert a crisis. As a result the pipelines in all the three big cities are old and need replacement. Inadequacy of funds restricts the ability of the municipal authority to replace the existing pipe network.

(f) Pipe Breakages

A common observation of the study team and also confirmed by municipal authorities was that if a pipe line passes through a slum or low income colony and there are no sufficient community taps within this colony then the chances of pilferage of water either by breaking the pipeline or by loosening its nuts at the service joints is a common phenomena. This was observed by the study team at Arjun Nagar and Kolar Colony, Pul Bogda and Chola Road at Bhopal, and Central market at Jabalpur.

(g) Cost of Supply

Ujjain has an outstanding payment of Rs.30 crores to MPEB on account of the energy consumption in the water supply systems. Badnagar has an outstanding of Rs. 30 lakhs. Shahpura in Jabalpur district gets a monthly bill of Rs.35000 from the electricity authorities. In Panagar an overhead tank is not being used because the council is unable to recover the expenses, main component being electricity charges. The PHE staff is paid by the state Government but the local body has to bear the payment of the daily wagers employed by the PHE personnel.

Despite high energy costs Tarana is planning three OHT of 15 lakh litres each and drawing water from

the Kali Sindh river which is 6-8 km from the town. Similar plans are underway in other towns as well. The helplessness of the local body lies in the fact that it is not the agency that designs or takes decisions on the water supply scheme for the city. The cost estimates etc are undertaken by the PHE department. The local body is given a scheme that it is unable to afford and given the low water tax collection most of the time it is in deficit and unable to maintain the cost of supply.

(h) Supplies to Institutional Users Industry

When the municipal body supplies water to the industrial area it charges a different rate to the user. The municipal body also has to pay commercial rate to the agency supplying water. For example at Bhopal the industrial area at Govindpura was getting its water from Hataikheda dam. The irrigation department decides on the charge every year: the charges from the Corporation increased from Rs 1.19 lakh to Rs 3.65 lakh in three years. Water is not being drawn from this source for the last 3-4 years as the expenses cannot be covered. Similar charges are paid by Ujjain Corporation to Water Resource Department for drawing water from Undasa Dam.

The charges for industry are difficult to maintain in case units are established outside the industrial area in the informal sector.

Selling Water (BHEL and GCF)

Large industrial areas for BHEL and GCF at Bhopal and Jabalpur which have their own residential areas as well the industries have installed their own filtration plants. They draw and pay for raw water to the municipal body.

Hotels and Restaurants

Hotels and restaurants get municipal water as well. They have also developed their own source, that is tubewells in all the cities. The hotels do not pay any extra amount for drawing ground water and using it for commercial purpose to the municipal body.

Hospitals

Government hospitals are provided free water by the municipal authorities. The nursing homes, clinics and private hospitals in private domain take municipal connection as well install their own tubewells to supplement the water supply from formal sources.

Hostels

Hostels are predominantly dependent on borewell to meet their water requirements.

Markets

Generally community tap connections are provided by the urban local body to supply water to market places. In Ujjain it was seen that some of the shopkeepers

have taken municipal connections. The adjacent shopkeepers also use the water.

Schools and Colleges

Government schools get municipal water either through tap connection or through the handpump. Private schools pay for the connection at subsidised rate and some cases (large schools) also have their own ground water source.

(i) Supplies to Slums

The study specifically focused on the water supply system in slum areas of the selected cities. There were very few private connections in slums (and that too to households that were early settlers and were politically powerful). Most slums have community taps and handpumps as formal sources of supply. Given the high density of population in slums it is not the distance but the density of households per connection that is important. This data is being given in Table 4.6

Table 4.6 indicates that the density of population per tap in slums vary between 9 per tap to more than 350 households per tap. In all the slums the issue of who takes water first and how much water each person can take was reported as the major issue by the households and also the reason for frequent (and sometimes violent) conflict amongst the dwellers.

Data in Table 4.6 indicates the lacunae in the data provided by Census 2001. It also underlines the need to get a disaggregated picture of the city if the data is to be used for policy purposes. The municipal bodies also do not collect similar data and often assume that since a community tap has been provided in the area it will serve the purpose of providing water to the slum dwellers.

(i) Water Markets

Water markets existed in all the cities studied during the present exercise. Providing water through the tanker is the most common form through which these markets operate. In Bhopal a typical water market supplies water to vegetable sellers on the day of the Haat at TT Nagar and Bitton market. In these markets water is sold in cans worth Rs 2 and 5 depending on the size to the seller.

Private tanker service is available in all the towns at rates varying between Rs 150 to Rs 250 for 2500 litres and up to Rs 350 for 3500 litres. The rates for the tanker increases in case it is called for events like marriage and birthday parties. In the event of death ceremony the charges are reduced given the gravity of the situation.

There does not seem to be any license fees or regulation for the supply of water through the tanker. In most cases the tanker owner has his own water source

Table 4.6 **Per Tap Density of Households in Selected Slums in Cities Selected for the Study**

| Slum | No. of Houses | No. of Tap connections | No. of Households per tap connection |
|------------------------------------|---------------|---------------------------|--------------------------------------|
| BHOPAL Banganga* | 2820 | 1315 private | 2.144 |
| Shiv Nagar | 500 | 2000 litre tank | |
| Ayodhya Nagar | 750 | 2 | 250 |
| Fatma Nagar | 150 | 2 | 75 |
| Kolar Colony | 700 | 4 | 175 |
| JABALPUR Deendayal Nagar | 700 | 2 connections | 350 |
| Bhola Nagar | 150 | 2 connections | 75 |
| Rajeev Nagar | 700 | 70 private | 10 |
| Temar | 300 | 30 private 3 community | 9 |
| UJJAIN Nagjhiri | 150 | No connection | |

Note: * refers to a colony comprising of Class III and IV employees of the government. There is an adjoining slum with 2000 households that also comes and draws water from this area.

(tubewell) though there are cases where the tanker owner is purchasing water from a private source and selling it through the tanker (e.g. Badnagar).

Issues: Water Supply and Accessibility Water Supply System

The water supply system in its technical details seems to be running on an outdated technology and with equipment that is worn out and old. The need is for a system of annual maintenance that is backed by adequate funds and a system that adheres to maintenance schedule. This not only requires prudent financial planning but also establishment of systems within the municipal body staffed by technically qualified staff. The geographical location of people living uphill and not getting water, while people in some downhill areas getting water 24/365 is an issue asking for cost effective technology savvy systems, perhaps not finding a place in the planning by the PHE or the corporation.

Domestic Water User Paraspar Housing Colony, Bhopal

Residents of the colony were concerned about the quality of raw water that was coming through their pipes. They got the water tested from the government laboratory. The water contained excessive calcium

carbonate, magnesium and bacteria. This prompted at least 10 households to install a water filtration unit in their house (worth Rs 10,000).

In middle and higher economic class colonies there was awareness regarding the source of water supply and a concern for quality (see Box). However the residents found themselves uninformed on standards of water quality and how they can deal with the situation where they are being given un-treated and raw water (by coloniser and even by municipal authorities). These residents do not know the implication of consuming raw water.

In colonies with low income, residents are generally not aware of the source of water and their concern with quality is of lesser degree.

There does seem to be any need for providing correct information to the domestic water users on the quality of water being supplied through the pipes and the way municipal authorities and the colonisers are extracting ground water and supplying it in un-treated form. The use of Aquaguard in towns is also an indicator of communities responding to the quality of water received by them.

Equity

Fixed water charges are levied on the residents in cities. This system is iniquitous as it does not collect charges on the basis of water usage. Secondly, this system does not promote conservation in water usage. Thirdly, low fixed charges imply that a high quality of water (treated and filtered) is being used for purpose that does not require water of such quality – watering of plants, washing of vehicles, washing of floor etc.

Metering of water is critical to enable the municipal authority to recover its cost and establish a system that collects charges based on usage and has the inherent advantage of promoting conservation.

Role of Colonisers

The mechanism adopted by the colonisers of collecting water charges at the municipal rate and later handing over the surplus when the colony is taken over by the municipal body needs to be questioned. The water charge of the municipal body is related to treated water, whereas the water supplied by the coloniser is raw water. Secondly, the water provided by the municipal body is subject to periodic quality check. Thirdly, colonisers are not paying any royalty for supplying water to the municipal body even though they are using water for commercial purposes.

There is ambiguity regarding the role and responsibility of the colonisers and the developers

in supplying water to the residents. Moreover, in the absence of a time frame within which the developer has to complete and hand over the colony to the municipal authority, the issue of municipal water supply tends to linger on for years.

Coverage of Supply System

The data on the actual coverage of population in the city through the formal water supply system is not available with the municipal authorities. The data provided by the Census has its own shortcomings as its assumptions are not valid at the ground level. The parameters for assessment of coverage by the Census and the municipal body do not present the data from the point of view of water entitlement. In such a situation it is difficult to assess the efficiency and effectiveness of the water supply system in terms of its ability to ensure water security for the residents of the city. The need is for identifying relevant parameters and developing indicators that can reflect the extent of fulfillment of water entitlements of all the residents.

Accessibility

The issue of distance of water source in the context of urban areas is not as important as the issue of number of households served by each water outlet. The high density of population makes it imperative that per capita density of water outlet be used as a measure of accessibility rather than the parameter of distance.

Economic capacity does play a major role in improving accessibility to assured sources of water. The higher income groups have chosen to develop their own source of water, resort to purchase of water, employ persons who will get water to their house and have large storage capacities. The poor do not have the economic manoeuvrability to accomplish any of these and therefore find that they have to share water with a large number of similar users. This decreases their accessibility as the water supplied through the formal sources is not a 24/365 affair.

4.3 Availability

Availability in case of urban areas implies, frequency of supply, duration of supply, supply pressure and the issue of water reaching the tail end of the pipeline.

Frequency of Supply

The frequency of water supply was an issue in all the towns. In the cities studied it was reported that there is at least one part of the town that did not receive water supply for a day.

In Badnagar water is supplied on alternate days till the month of February. During March and April the

water supply is on every third day. During the peak of summers (May and June) the situation reaches a stage that water is supplied once in four days.

Mohanpura the residential area of the old city in Ujjain receives water once in four-five days as the pipeline in their area has been damaged and not been repaired. On the other hand there is another area of the city that is known as gali number one in ward 22 that gets water 24/365 as it is located on a slope (*dhalan par hai*).

Tarana supplies water to the residents once in 3 days in the months of May and June.

At Bhopal in Gandhi Nagar water is supplied through tankers by the Corporation every third day throughout the year.

This highlights the fact that when the local body claims to be supplying so much LPCD, it also needs to specify whether it is able to achieve that for all 365 days in a year.

Duration of Supply

Shahpura is able to supply water two times a day for one hour each. But it faces a problem of maintaining fixed timings as the water is supplied directly from the tubewells, the functioning of which is dependent on the availability of electricity.

Shahjanabad colony in Bhopal gets water for 10-15 minutes. Ayodhya Nagar in Bhopal gets water for one hour as per the contractor, but the residents say that the water comes for 15-20 minutes from March to June and from July to December the supply is for one hour. The Sai Housing Board Colony gets water for four hours though the houses on upper slope in the colony get water for two hours only.

Nehru Nagar in Ujjain gets water for 30 minutes on alternate days. Mahananda, Mahashakti and Police Line areas are given water for three hours every day. Indira Nagar gets water for two hours, Chhatri Chowk for one hour and Gopal Mandir Hospital area get for half an hour.

The above examples highlight the fact that there is difference in supply of water to different parts of the city and also to different parts of the same colony. However it seems that the better off colonies get water for a longer duration than the colonies that are not economically prosperous including the slums. The government policy defined on the basis of lpcpd does not differentiate between the economic classes. The supply agencies seem to have a different notion as duration of water supply is directly correlated to level of economic prosperity of the residential area.

Ujjain Corporation

Ujjain Municipal Corporation takes pride in the fact that they have highest LPCD in the state. The ground reality is that there are large pockets in the city that do not get water every day. Moreover when they get water it is less than the minimum LPCD defined by the government.

Pressure

In Shahjanabad, Bhopal the water supplied by the pipes does not reach the houses on the upper slopes. These households have to bring their vessels in the lower regions and fill water from the pipeline by making a pit below the outlet without a tap to fill the water. A housing board colony near Berasia is adopting the same practice of coming downhill and filling water.

Madotal, Jabalpur

The water in pipes is secured from the tubewells located on the circumference of the pond. The old residents (approx.200 houses) near the lake, few (3-4) houses in Kasondha Nagar and ITI colony (50 houses) get water from this source. But all the three pumps have to be working at the same time, so that pressure is built and ITI Colony gets water.

In Jabalpur, the Tripuri area is housed by middle income group houses. The houses are located on the hill. The houses located on the lower side of the hill have been provided pipe connections by the Corporation. The residents uphill are not given connections as the water pressure was likely to be insufficient. Similar situation exists in Madan Mahal. The Chief Engineer of the PHE department disclosed that in some colonies in the city the water from borewell is added to the water in the pipeline to increase the pressure so that water reaches the tail end of the pipeline.

Issues in Availability

Water Security

The issue of frequency, duration and pressure of water supplied by the local body was a major source of discontent in most of the residential colonies and slum settlements of the city. From the users point of view these are the three factors that define the assurance of regular and sufficient water supply to the household. According to most of the households these three factors constitute the basis of assessing the performance of the local body in their ability to supply water to the city.

Any shortfall in frequency, duration and pressure of water constituted the situation of water insecurity for the households. The households in such cases would undertake their own measures depending on their affordability. For example the well-off sections of the city would resort to installation of tubewells,

accessing water from far away sources, or pooling resources and getting a tanker for a cluster of houses. The poorer households and persons residing in slums would either loosen the nuts and bolts of the pipeline near their settlement, access water from ponds, wells or from another public source (handpump, factory etc).

People find their own ways to fulfill their water requirement as it is an issue of survival for them. If the water requirement of the people is not getting fulfilled through formal means it implies failure of the local body in fulfilling its responsibility for good governance and a situation of water insecurity for the households.

4.4 Quality

The System: The PHE department in all the towns specified that the water is checked regularly. However on deeper inquiry it was revealed that it is the water from the surface source that is checked regularly. The testing of water from the tubewells is done only when a problem is reported as happened at Shahpura in July 2003, when water from all the tubewells was tested after there was a report of illness. Since then no such test has been undertaken.

The study was unable to procure a test plan or list of parameters to be tested from any PHE official in any of the cities. One of the reasons for lack of regular testing of water reported by the department was lack of resources to undertake this task regularly. In contrast, the BHEL personnel in Bhopal gave a detailed plan of the tests to be carried out daily, weekly, monthly and annually.

Fluoride: Tripuri and the stretch from Dev Tal to medical college in Garha zone of Jabalpur have fluoride. Many of the handpumps have been closed and/or marked, though some are still in operation. Water from these handpumps is being used for washing utensils and for other domestic work. People use drinking water from the wells, bawadis or tankers supplied by the corporation. Dental fluorosis seems have set in amongst the population in the area as yellowing of teeth has become visible in disturbing levels. The officials at the zonal office reported that though the people know that water is contaminated by fluoride and its adverse effects, they still consume it. Information about fluoride has been displayed on boards. The study team found out that though people are not taking contaminated water for drinking purposes they are consuming it for other domestic purposes.

Other Contaminations: In Moti Nagar at Ujjain handpumps with saline water were reported to the study team. In fact according to the residents salinity

has reached a level that it has led to damage to the iron water tank making it unsuitable for storing water. The people in the Gandhi Nagar area shared that water in the wells and one handpump has a strange taste – *dal nahin galti aur sabun phatta hai*.

In Bhopal, the people in Chuna Bhatti area got the water tested and found high contents of calcium carbonate, magnesium and bacteria. These tests were from different tubewells in the area. Windsor Colony also reported having red water in their borewells. The redness in water is attributed to clay mixing in some of the tubewells in Bag Mughalia colonies by the housing board officials. Residents of some other colonies shared that their clothes tear off faster and there is yellowness in the clothes after being washed.

Salinity has also been reported from Shahpura. Ward 3, 4 and 5 have 4-5 handpumps with saline water. The people and the officials say that it is a very old problem, though nothing has been done to address this issue so far.

At Badnagar the water from tubewells is mixed with water supplied through supply scheme. According to people there is a strange odour that is attributed to the mixing. According to a chemist in the area there is no solution to this and since the test reports are 'fine' there is no cause for alarm.

Issues in Quality

Disclosure of information

The PHE cell of the local body undertakes quality surveillance but the information so collected does not become part of the information fed to the public. Discussions with citizens revealed that they did not have any information regarding the quality of water being supplied to them. In case of Jabalpur where water has been found to be contaminated with fluoride the citizens did not have information on the extent of contamination and the implications of consuming such water. The information with respect to quality of water does not form part of the report that is tabled during the meeting of the general body of the urban local body.

People's Concern

The consumer is concerned about the quality of water she/he is consuming. Where the people can afford they have spent money in getting their water tested. In fact, during the course of study the households that had installed tubewells reported that they had got their water tested to assess its quality. Similar concern was also observed in slum settlements where people did distinguish between sources with better quality.

Surveillance System

Surveillance system that monitors quality of water from all sources (supplied by local body, colonisers, development authorities, housing boards etc) is assessed by the study team as a need of the citizens. The reports of such a system need to be fed at the public and organisational domain in a manner that is understood by the lay man. The excuse for lack of resources, as stated by the officials of the urban local body, cannot be taken as either valid or tenable.

4.5 Demands for Water

The study sought to estimate the quantity of demand for water by residents in the selected study. The process of estimation was difficult because:

- The households that were getting piped water supply were unable to estimate the water requirement in terms of litres. They however expressed their requirement in terms of storage facility that was sufficient for their family for a day. This was an overestimation since the water stored is always more than actual demand for water given the lack of assurance of regularity of water supply. The study found out that in houses with piped water supply that form part of the middle and upper middle class families have an average storage facility of 1000 litres even if these households have developed their own source of water (tubewell). However, in towns that have water supply twice a day, the average storage capacity was found to be 500 litres (Panagar and Shahpura).
- The households in lower middle class living in colonies and securing water through piped water supply had storage capacity that ranged from 50 to 100 litres. The problem of estimation for these families was the same as in case of families in middle income groups.
- The slum population of the city is fulfilling its water requirement based on the supply of water from community sources. Again the problem of estimating demand for water was faced as the households in all slums reported that their water use is dependent on the amount of water that they are able to collect for the day. In case the household is unable to collect sufficient water the members would not take bath that day or would go to a different water source for bathing. In such a case the actual quantity of demand for water was difficult to estimate. However the households in slums were storing water in buckets or plastic cans. In some cases steel containers were also being used to store water.

The study instead of estimating quantity of demand for water focused on the nature of demand. This showed variations across economic classes:

| Nature of demand | Middle and upper middle class | Lower income group | Slum dwellers |
|----------------------------|-------------------------------|--------------------|---------------|
| Drinking water | ✓ | ✓ | ✓ |
| Bathing & personal hygiene | ✓ | ✓ | ✓ |
| Washing clothes | ✓ | ✓ | ✓ |
| Cleaning of utensils | ✓ | ✓ | ✓ |
| Cleaning of house | ✓ | ✓ | |
| Washing of vehicles | ✓ | | |
| Watering of plants | ✓ | | |
| Coolers during summers | ✓ | ✓ | |

School and colleges emerged as major users of water in the study. On an average each high school has a storage capacity of not less than 4000 litres. The storage facility is distributed in different locations within the premises – drinking water tanks at defined locations, toilets, watchman’s residence and a main storage tank. Similarly hostels accommodating outstation students had a storage capacity ranging from 4000-8000 litres. This was a common feature in all the towns.

Small restaurants serving food stuff /snacks, including the sweet makers have a storage capacity of 1000-1500 litres. The hotels with facility to stay have a storage capacity of 4000-6000 litres. All of them have a private source besides the corporation connection.

The storage capacity in hospitals depends on the size of the hospital i.e. number of beds. In residential colonies the hospitals have a storage capacity of 1500-2000 litres. The private hospitals have their own source of water and higher storage capacity.

Issues Demand for Water Assured Supply of Water

The quantum of demand for water is dependent on the degree of assurance that the consumer is able to assess from the supplier. The degree of assurance is assessed in terms of the time period (days) for which the user needs to store water before the next supply of water will be released.

Water and Nature of Demand

The study strongly feels that the consumption of water meant for drinking being used for purposes like washing of clothes, cleaning of vehicles, watering plants and using for coolers indicates inefficient water usage. The fact that this water is supplied at a subsidised rate further indicates economic inefficiency in water supply.

Sanitation

5.1 Preamble

Scene I

Researcher : “Sir, what is the state of sewerage network in the city?”

Commissioner : “There is no sewerage network in the city. You should talk to the Health Officer. He will give you information in detail.”

Scene II

Health Officer : Giving details of the cleaning zones of the city and number of staff employed he said, “there are sufficient toilets in the city”.

Researcher : “What about slum settlements?”

Health Officer ; “There are 117 slum settlements and 5 Ayodhya Bastis. We are putting community toilets in these Bastis. There has been no complaint of any disease. So there is no problem.”

Researcher : “What about the sewerage network in the city?”

Health Officer : “Sewerage is the responsibility of the PHE department”.

Scene III

PHE department : “The sewerage was handled under a specific project and the project is now over. Mr. X was deputed in the project. Only he can give you the details.”

Mr X: “The project was to prevent waste water from entering the river. The project has been implemented but not functional as the Municipal Corporation is not taking over. They have put the project in cold storage (*thande baste mein*).”

Some random responses

“We have done lot of work in sanitation. Y number of dry latrines changed to flush type”.

“There is sufficient drainage in the city. The people here do not have civic sense. They keep throwing all sorts of garbage into these drains.”

“People in the city *mein abhi bhi rural mentality hai*.”

“While buying a house people see the interiors, no one looks at the sewage system of the place. So it is people who are not interested”.

“ADB project is going to deal with this (sanitation)”.

Researcher : “Can you tell us how is the local body geared up for the project and what are your preparations after the project is over?”

“The project is going to take 5 years, we will see then. Right now the officials are being nominated from the PHE”.

.....about the study?

“There is no need for any more study”.

5.2 Sanitation Status

The issue of sanitation in the context of urban areas includes: prevalence of private toilets in houses; disposal mechanism of human excreta; liquid waste and solid waste generated in the cities.

5.2.1 Toilets

The issue of toilets in the cities selected for the study was essentially at three levels:

- Conversion of dry latrines into flush type toilets in smaller cities.
- Toilets in slum settlements in larger cities.
- Toilet facilities in institutions.

Conversion of Toilets

The Nagar Panchayats and Municipal Councils covered under the study received funds for creation of basic infrastructure to convert the dry type toilets to flush type. The coverage as stated by the urban local body and as found during the field survey are being given in Table 5.1.

There is a wide variation in the data collected from the field and the claims stated by the urban local body. The officials from the urban local body expect the elected representatives to play a proactive role whereas the elected representatives were either unaware of the process of procuring funds or were indifferent towards this issue. The team assessed that the elected representatives did not have a vision or idea regarding cleanliness and sanitation of the city and the activities that are required for the same.

Slum Settlements

The slums in all the towns have a small percentage of houses having private latrines. The number of community toilets in the slum does not commensurate with the population of the slums. The data collected for larger cities is given in Table 5.2.

The households that report no facility of private or community toilets are resorting to open defecation. The site for defecation depends on the space available near the settlement – nallah, railway line, trees, mines, open ground, dried up ponds.

The experiment with community toilets has not been encouraging. The present study found that community toilets have been made at six slum settlements. Amongst these three are being used. The main reason for non-use of the community toilets is the non-availability of water (the local body has not installed water connection).

At three places where the community toilets are being used their coverage is very small given the size of the settlement. However what is significant is that the users are paying for the use of these toilets – at Idgah and Shiv Nagar (see Box) the family is paying Rs 10 per month whereas at Arjun Nagar the user-families are making efforts to secure water and maintaining the facility.

Toilets in Institutions

90 per cent of the institutions covered under the study had functional toilet facilities. These institutions were well connected with water facility and had

Table 5.1 **Status of Conversion of Dry to Flush Type Toilets in Cities Selected for the Study**

| City | Response of the Urban Local body | Findings during Field Visits |
|----------|---|---|
| Panagar | <ul style="list-style-type: none"> • Coverage – 95% toilets • 2 community toilets • 1 Sulabh at Bus Stand | <ul style="list-style-type: none"> • Ward 10 – 50% of the houses have toilets • Ward 4 – No toilets there • 800 toilets converted to flush type • Open defecation prevalent |
| Shahpura | <ul style="list-style-type: none"> • Coverage – 80% toilets | <ul style="list-style-type: none"> • Ward 13 – 80% houses have toilets • Ward 2 – 60% houses with toilets • Ayodhya Basti – 15% houses have toilets • Open defecation prevalent |
| Badnagar | <ul style="list-style-type: none"> • 80% toilets • 9 community toilets • 1 Sulabh 15 seater at the Bus Stand | <ul style="list-style-type: none"> • Open defecation in Wards 5,6,17,18 • Sulabh Complex almost closed as the tubewell has gone dry and council gives supply once in 4 days • No community toilets seen in 6 wards visited during the field study • Ward 12 has toilet outlets in the drainage line, excessive number of pigs in the area |
| Tarana | <ul style="list-style-type: none"> • 450 toilets converted to flush type | <ul style="list-style-type: none"> • Ward number 2, 3, 7 do not have any toilets • Details of where the toilet conversion has taken place not known to people and the councillor • In the old part of the city, houses are small and hence no place for toilets • Community toilets not seen |

Table 5.2 **Private and Community Toilets in Slum Settlements in Cities Selected for the Survey**

| Name of the Slum | No. Of Houses | Toilets |
|--|---------------|---|
| Jabalpur | | |
| Deen Dayal Nagar | 600-700 | No Toilets |
| Near Sanchar Colony | 500-600 | No Toilets |
| Behind Bhola Nagar | 150 | No Toilets |
| Rajeev Nagar | 600 | 10% Toilets |
| Muslim Mohalla | 100-125 | 30% Toilets (Opening in Nallah) |
| Ganj Badhaiyya Mohalla | 200-250 | 40% Toilets (Opening in Nallah) |
| Bhopal | | |
| Sai baba Nagar | 1600 | No Toilets Community Toilet under construction |
| Ayodhya Nagar Slums | 750 | No Toilets |
| Slums near Idgah Hills | 600 | 4 Community Women Toilets 4 Community Men Toilets |
| Arjun Nagar | 1000 | 6-8 houses may have toilets Sulabh Complex closed as no Nagar Nigam connection. 20-25 families use it and bring their own water. |
| Rahul Nagar | 100-125 | No Toilets |
| One tree Hills slum | 200-250 | 15-20 houses have private toilets |
| Ujjain | | |
| Indira Nagar | 250 | 10 seat community toilet No water, gets very dirty and is not being cleaned, not being used at the present |
| Rajeev Nagar | 200-250 | 40% houses have toilets Community toilets with contribution of Rs.120 were made in 200 houses but not used as “kachhe bane the, diwar nahin” |
| Mulla pura + Raghupura (Ayodhya basti) | 247 | Survey completed for making toilets with Rs. 200 contribution. At present no toilets |

also employed a person for cleaning toilets. In the remaining 10 per cent of the institutions the toilet facility was created but was not being used as there is still problem with regular supply of water. All these institutions were schools.

Shiv Nagar (near Anand Nagar), Bhopal

The settlement had around 300 houses. Households from Piplani and Lal Tanki were shifted and resettled in this slum. This increased the slum population to about 500 houses. There are separate community toilets for men and women (7 for women and 12 for men). There are 2 bathrooms each for men and women.

Every regular user-household pays Rs.10 per month for the use of bathroom and toilet facility. Occasional user pays Rs.2/- per visit. A person from within the slum is employed for maintenance. The complex has a 1000 litre tank filled daily by tanker service from the Municipal Corporation.

5.2.2 Disposal of Human Excreta

The norm for disposal of human excreta in residential colonies is to connect toilets with the gate sewer. This is then connected to the street sewer and then on to the trunk sewer. The trunk sewer off loads itself into the septic tank. The sewage in septic tank is subjected to anaerobic treatment for separation of effluents and is then disposed off to a safe place mostly some nallah or soak pits. Plantation of water absorbing plants like eucalyptus is undertaken near the disposal site.

However during the course of this study the team did not find the entire system in any of the colonies covered in the selected cities, except BHEL in Bhopal (see Box). In addition, the waste water from kitchen and bathroom is also connected to and disposed off along with the sewage line that restricts the possibility for its re-use.

Sewerage Disposal System, BHEL Township, Bhopal

There are two sewage treatment plants in BHEL township located at Piplani (0.5mgd) and at Barkheda (2 mgd). The effluents from the township are converted to biogas (functional since 1964) and manure. The biogas is supplied and used by the chappati centre and to the kitchen of Kasturba Hospital. The manure is distributed to the farmers nearby and to the horticulture department. Extensive plantation of eucalyptus trees has been undertaken at the waste water outlet.

In larger cities, Bhopal had a sewerage network for a part of the city. Ujjain and Jabalpur cities did not have any sewerage network. In these cities the sewerage from the toilets flows to the pits (dry and flush type), septic tanks or the open nallahs.

Catch 22 for Residents of Deepak, Bhopal

The sewerage of Amaltas Colony opens in to Deepak Colony in the neighbourhood. The residents of Deepak Colony complained about it to the residents of Amaltas. The latter informed them that the sewerage is maintained by the builder hence the complaint should be lodged with the builder. On calling up the builder of Amaltas Colony, they asked about the name and address of the complainant. They cut off the connection saying that they cannot entertain the complaint as the complainant is not a resident of their colony.

The level of information available to the citizens regarding the proper and the existing method of disposal of toilet waste was found to be quite low in all the cities. One professor puts it in a lighter vein "it finds its own way". All the residential colonies covered during the study had septic tanks, the size of which was unknown to the residents. The outlet from tanks opened up into open space nearby that was in gross violation of the norm. Generally the residents were unaware of the outlet and on being informed of the outlet they did realise that it is violation of the norm but did not know how to rectify the situation.

In the 'old city' area of larger cities the study found that the private toilet from each house is connected to a pit that is covered and is either within the premises (aangan) or in the immediate vicinity of the house. The responsibility for getting the pit cleaned is that of the household and they normally lodge their requirement to the corporation and get the pit cleaned. The sweeper is paid for his services. This system was found in all the three cities except for a small portion of Bhopal old city that has been now connected with a sewerage network after the implementation of Bhoj Wetland project.

5.2.3 Liquid Waste Disposal

The waste water disposal system in the cities is through the network of drainage. Earlier the drain lines were 'V' shaped in most of the smaller and medium sized cities. According to the CMO of Panagar, with increase in population these drains were found to be inappropriate as they were not able to handle the additional flow of water. Consequently, the shape of these drains was changed to 'U' shape in later constructions.

The officials of the urban local bodies claim coverage of 50-70 per cent of the city from drains. This coverage is contested by residents and by the councillors. The reason for the low level of coverage given by them is extent of slum settlements and urban villages in the towns. These are the areas that are deficient in drainage system. The area under these settlements is more than the area claimed to have been covered by the urban local body.

The maintenance of drains has been identified as a problem both by the officials of the urban local body and by the citizens. According to the former there is lack of civic sense among the residents (Tarana and Panagar) and in many colonies the residents dispose off their solid waste (broken pots by Kumhar, or bidi leaves remains) in the drains leading to its choking. The CMO of Badnagar felt that maintenance of drains is a problem area as the local body does not have enough manpower to cover the entire town.

The corporations had drainage nallis made in the higher and/or middle, upper middle class colonies. But these too were found to be choked and/or opening at the wrong place. The study team found the underground drainage was choked in Kanchen Vihar, Jabalpur a well laid out colony. In Ujjain the residents of Revenue Colony contribute towards the salary of one person responsible for keeping the area clean. The problem of drainage lines opening up in a neighbouring empty plot were observed in all the cities.

A major issue that threatens to create an ecological disaster in the cities is the gradual process of converting natural drainage lines into drainage/sewage disposal lines of the city. The erstwhile drainage lines that were feeding into the major rivers have been converted into drainage disposal lines by the administration and the people. Omti Nallah of Jabalpur is a prime example of this process. The nallah was a natural and active drainage that used to feed into Narmada river. With the change in the quality of water flowing from the nallah the quality of water in Narmada river has been adversely affected. A part of the sewage line of Bhopal opens up in a nallah near Hoshangabad Road. Even the small towns show the same trend where the nallahs feed into rivers without

treatment, e.g. natural nallahs of Tarana that used to feed into the Kalisindh river today carries the waste water of the entire town to the river.

In Ujjain a special project for Shipra cleansing was undertaken from 1999 and completed in 2003. The objective was to treat the waste water before it flows into Shipra. The project was implemented but it has not been accepted by the corporation as it involved electricity charges of Rs.14 lakhs per month.

5.2.4 Solid Waste Disposal

All the local bodies have dumping grounds for solid waste disposal, but none of these bodies have a system of segregation of solid waste either at the point of collection or disposal. The Nagar Panchayats and the Municipal Councils have a system of solid waste being collected in hand carts and then ferried by tractors to the dumping ground. The Corporations have a infrastructure that includes garbage collectors (from dustbins or open spots), designated collection point at the ward level from where the dumper carries the waste to the dumping ground.

Ujjain city is divided into seven zones for cleaning with collection centres clearly demarcated. The system is developed and reviewed every 12 years when Simhastha is held. There are 1060 labourers, 100 hand carts and 54 dumpers vehicles. The Health Officer admitted that only 70 per cent of the waste at dumping ground at Gau Ghat can be ferried to the trenching ground. Thus 30 per cent of the solid waste remains at the dumping ground. The total cost of sweeping, collection, dumping and transportation is Rs. 840 per tonne. Every day the city generates solid waste of 150 tonnes which requires an expenditure of Rs 1.26 lakhs per day, at an efficiency level of 70 per cent.

Dustbins are a rarity. In all the cities the upper class colonies have a better network of dustbins and a better frequency of their disposal. The remaining town is denser, generates more waste and has less space to dispose it. The dominant attitude in the middle and lower middle class residents is that their own house is clean but the disposal is either in front of their own house or in an open space near the house. The state of solid waste in the urban areas is best described by the CMO of Panagar, "All around the dustbin, you find waste, as going near the dustbin to throw the waste gives a dirty feeling".

The ruling of Supreme Court regarding SWM and the action thereof has resulted in all the local bodies submitting proposals for identification of trenching ground, vehicles, provisions for segregation, etc. Badnagar has put in a proposal of 166 lakhs, Shahpura has put in a proposal of 70 lakhs and so on. The trenching grounds are 3-4 km away from the town

but either behind a Ayodhya Basti (in Badnagar) or near a village (in Panagar). Cases of solid waste being put in the ponds, behind the walls of an old building as open dumping space (urban villages) and on the streets was observed everywhere.

5.2.5 Hospital Waste Disposal

Hospital waste falls within the purview of the Pollution Control Board. The hospitals or any other institutions generating biomedical waste have to pay authorisation fees to the Board. The fee is based on the number of beds in the hospital. For annual renewal of this fee the hospitals have to get a certification from the agencies responsible that they are handling the waste in accordance with the legal framework.

Waste: Hospital waste is classified as toxic waste and non toxic waste. Toxic waste comprises of sharps, anatomical waste and blood contaminated items. The cutting edges of sharp instruments (knife, needle etc) have to be cut with cutters and disinfected with sodium hypochloride 1 per cent solution before disposal. Non toxic waste comprises of bandages, plasters, drip bottles, u/v tubes, discarded medicines, liquid waste, laboratory testing specimens. It is necessary to shred plastic bottles to prevent their reuse. The waste is segregated and kept in colour coded containers.

Disposal: The norms stipulate that disposal site of bio-medical waste should be 2-3 km away from human settlement. There should not be any drinking water source near the site nor the site be in the catchment area of a river. The waste disposal mechanism should be such that it does not lead to the contamination of ground water. The disposal rules state that there should be deep burial of the waste excluding plastic which can take place in towns with population less than 5 lakhs. Layers of lime, bleaching powder, soil are put in the pits to accelerate degradation. This can be used as good manure, but so far no testing of the same has been done hence it is not permitted to be used. The placenta is about half kg per delivery which gives an idea of the volume of usable waste.

For towns with population more than 5 lakhs, there is a need to incinerate the waste. The incineration process is in two phases. The first chamber burns the waste at 550°C and the second chamber burns at 1050-1100°C.

For transportation of the bio-medical waste there are specific norms. The agency undertaking transportation has to be registered with the Pollution Control Board and has to pay fees (annual Rs.17500) to the Board to undertake this activity. Hospitals pay collection charges as per number of beds to the agency collecting and transporting waste (Rs.3 per bed per day).

Gwari Ghat – Facing Pressures of Urbanisation

Gwari Ghat a rural settlement within limits of Jabalpur Municipal Corporation is located on the banks of Narmada. It has temples, ashrams, hotels, residential populace etc. Part of the area is now covered under the Ayodhya Basti programme.

The area had 10-12 wells of which only 2 remain now. The area had 5-6 bawdis all of which are closed now. They earlier had a system of ghooras that has now been replaced by dustbins. The Corporation started a Narmada Water Scheme in which Gwari Ghat was not covered. The residents of the area protested by breaking the pipeline resulting in contamination of water and subsequent outbreak of cholera. The protest led to the area getting a new pipeline linked to the Scheme.

The area has three community toilet complexes which are supplied water by the Corporation. However the waste of the hotels and the residential area first flows in this well. The well is not cleaned and contaminated water seeps into the river. Earlier this entire waste was going into Narmada. The people do not have control over this system and they are at odds as to how to maintain and take benefit from this system.

The hospitals covered during the study at Bhopal, Ujjain, Jabalpur did state that they hand over their waste to the local body which disposes the waste according to their norms. The local bodies burn the waste in the incinerators. The study however was unable to verify the claim of the hospitals and the Corporation. At Badnagar the Civil Hospital doctors reported the hospital waste is collected by the Municipal Council and disposed off along with the other solid waste of the city.

Issues in Sanitation Whose Concern is Sanitation

Private toilets and drainage are the responsibility of the PHE cell of the urban local body, sewerage network is the responsibility of the PHE department and SWM is the responsibility of the Health Department of the municipal body. In this scenario of multiplicity of institutions it is difficult to assess the overall body that has the vision and the resources to draw up a master plan for sanitation in urban areas. The two primary questions that need to be addressed are:

- (a) How can the agencies come together and develop a coordinated plan of action?
- (b) What are the minimum norms that apply for sanitation that can be followed by the agencies responsible for different aspects of sanitation?

Role of Elected Representatives

The interviews with elected representatives in all the local bodies covered under the study indicated

Map of Gwari Ghat



that they were not aware:

- of the quantum of the problem (how much)
- of the nature of the problem (what are the different dimensions)
- of the steps or activities that are required for complete sanitation (what needs to be done)
- of the impact of unsanitary conditions in the city (what will happen)
- the role of the local body (who does what)

At Shahpura the councillor sent his representative along with the team for visit to the ward. He excused himself on grounds that people would make complaints about the dirty environment as the ward was not being cleaned for the past two months. The corporator at Ujjain was able to identify pockets where there was problem within his ward but they was unable to give a composite view of the ward and what needs to be done to ameliorate the situation.

The only role that the elected representative saw for themselves was to go and reiterate the complaint made by the citizens. They were not concerned with the review of the system and to seek a long term solution to the problem. In certain cases they also blamed the citizens for dirtying up the city by throwing garbage indiscriminately (at Jabalpur).

Colonisers

The current trend of growth of cities is through the colonisers – within the public or the private sector. The building permission is given by the urban local body. The norms applicable for these permissions need to be strictly adhered to and the development of basic infrastructure (sewerage network, drainage etc) should be in place before the permission for building is granted. Laxity in this process not only deprives the residents of the facility that they have already paid to the coloniser and the local body as development charges, it also implies augmentation of the problem for future remedial options as these get restricted with decrease in availability of space and resources.

Master Plan for Sanitation

The Master Plan for Development of the city does not focus on developing the Master Plan for sanitation of the city. It only details the norms that are applicable but does not for example identify possible sites for waste disposal of sites for treatment plants etc. Despite the fact that the growth trend of the town is known and the pressure for sanitation is likely to increase in future, the Plan does not detail the technological options available to the local body and the institutional mechanism available to it.

Drainage and Ecology

The practice of using the natural drainage line as the main artery for draining waste water from the city needs to be challenged. In addition to the fact that it is an imminent natural disaster, the drainage line also traces the path along which most of slum settlements of the city are located (as they are marginal low lying lands in the city). The discussions with the PHE department and the urban local bodies did not reveal this as a concern in their plans. They have started taking the natural drainage as given and talk of city drainage as the natural extension of the natural drainage in these water outlets.

Sanitation and Slum Settlements

The density of houses in slum settlements does not indicate the possibility of private toilets in all the houses. The potential for community toilets is immense and the only reason for failure encountered by the study has been disconnection of water supply. Where the community toilets are being used the users are paying for it or taking extra initiative to secure water for the toilets. The users were also satisfied, especially as separate toilets have been made for men and women. The latter were categorical that they find the facility useful as it allows them to go to work on

time, can use at any time of the day and provides them privacy.

People's Participation

In none of the programmes of sanitation – promotion of private toilets, conversion of dry to flush toilets, laying of drainage lines, construction of sewer network, disposal of solid waste from houses – are people involved in the decision-making process. The schemes are designed and implemented by the agency without consulting the residents of the area.

The opportunities for participation exist in residential colonies developed by colonisers in the public and private sector as the colonisers are expected to form a Development Committee of the colony. This committee has the responsibility for all the maintenance issues including water and sanitation. Moreover the development fund collected by the coloniser is also to be handed over to this committee. The study found a high willingness to participate in residential colonies comprising of middle and lower middle class households. The residents of these areas want to know about the rules related to water and sanitation and are concerned as to how their money is being spent by the coloniser and the local body.

Is there a Resource Crunch?

None of the urban local bodies in any of the towns studied, reported that the poor sanitation, condition is on account of shortage of funds. The main reason according to them is lack of proper planning, inadequate emphasis given for the implementation of rules and indifference of people and the representatives in giving priority to sanitation. According to them the people come to the local body only if there is a serious complaint or a grievance.

Recommendations

The recommendations for the current exercise are related to the programming interventions for WaterAid India for urban areas in Madhya Pradesh. There are two broad set of recommendations: one, that are city specific interventions; and second, interventions that relate to WATSAN sector for the urban areas. The former would include direct interventions for the city to develop demonstrative models under Water and Sanitation and the latter would include advocacy based interventions that seek to have an impact on the system and its procedures as well as on the policy related to the sector.

6.1 Replication of Existing Models

The system of water supply and sanitation that exist in townships of BHEL and GCF are noteworthy. Each of these townships caters to a population of more than 50000. The technological and institutional system adopted by these townships are worth replicating for small and medium towns (at least). The need is to develop these systems as a model with cost, design, quality assurances and O&M dimensions for replication. The study recommends that the system in both these townships be studied in their technical and economic feasibilities and use for replication in other cities.

6.2 Developing Demonstrative Processes

The water and sanitation scenario in urban areas suggest that it will be more meaningful and relevant to develop demonstrative processes related to:

- a) **Planning for source development** – The macro /regional aspect of assessment of water, its competing use and technological options available to maintain its sustainability need to be linked into a comprehensive plan for water usage. In many cases it is likely that this process will be beyond the limits of urban local body and hence might require constitution of a body that has a wider perspective on the issue.
 - b) **Feasibility assessment** – The process of assessing various technological options and their suitability in the context is another area where substantial inputs are required. An important aspect of feasibility that is often overlooked is the cost of energy required in accessing and supplying water.
 - c) **Institutional processes** – The multiplicity of institutions in the supply side and non involvement of forums from the demand side indicates a gap in the process of institutional participation in decision-making process. The critical institution of the urban local body which has a legal mandate to provide services in
- WATSAN needs to be brought in the centre of the existing institutional space.
- d) **Cost recoveries** – The current level of cost recoveries by the local body indicate laxity in enforcement and fixed water rate regimes indicate inequity in supply. Developing an intervention that is able to initiate a process of dialogue between the supplier and the consumer will be able to address both these issues.
 - e) **Performance appraisal** – Developing parameters and indicators in assessing the performance of urban local bodies in provisioning of services in water and sanitation will be empowering to both the consumer and the supplier. Developing an assessment at a decentralised level (zone or ward) will strengthen the institution and will create opportunities for meaningful people's participation.

6.3 Issues in Advocacy

At a broader level two sets of issues can be identified for advocacy:

- a) at the policy level that will affect all the areas of Madhya Pradesh

This will include issues related to

- Setting minimum norms for water and sanitation that each local body has to ensure to qualify as an institution of good governance.
 - Role of different institutions in ensuring the provisioning of services in water and sanitation. This should include the statement on the role of parastatal organisations like development authorities, housing boards etc.
 - Policy of urbanisation.
 - Policy related to slums and their entitlements.
 - Debate on the advantages of having a separate organisation like Jal Board for supplying services in water and sanitation.
- b) Issues related to specific city context
 - Level of awareness among the elected representatives regarding procedures, processes and practices related to water and sanitation
 - Building the capacity of officials of the PHE cell and the elected representatives to be able to address the issues of water and sanitation in their respective areas
 - Solid and liquid waste disposal mechanisms that are context specific, locally relevant and environment friendly.
 - Developing effective mechanisms for interaction between citizens and governance institutions.



The research/views contained in the publication are the sole responsibility of WaterAid India and can under no circumstances be regarded as reflecting the position of European Union

WaterAid – Water for All

WaterAid is an International NGO, established in 1981, in response to the United Nations declaration of the Water and Sanitation Decade, 1980–90, to enable better access of poor communities to adequate, safe water. WaterAid remains the UK's only major charity dedicated exclusively to the provision of safe domestic water, sanitation and hygiene education to the world's poorest people. WaterAid works in 15 countries across Asia and Africa, through local organisations and communities, helping them set up low cost, sustainable projects using appropriate technology that can be managed by the community itself. WaterAid also seeks to influence the water and sanitation policies of other key organisations, such as governments, to secure and protect the right of poor people to safe, affordable water and sanitation services.

WaterAid in India

WaterAid began working in India in the latter part of the 1980s with a few small projects and has since grown in strength and coverage. Today, WaterAid works in more than 10 states with three regional offices in Bhopal, Bhubaneswar and Bangalore, in partnership with local NGOs and government departments and ministries that seek assistance in the specific areas of rural and urban water supply, sanitation and hygiene promotion. Community sustained improvement in drinking water and sanitation has been WaterAid's watchword in all its programmes.

Different models of community participation and management, of both rural and urban water supply and sanitation, alternate delivery mechanisms, school hygiene promotion programmes, water conservation and recharge measures have been demonstrated to the sector. These projects have a strong partnering component with state governments and departments and have proved to be the inspiration behind successful replications in other states. A vast array of publications, including training manuals for development workers, issue sheets and concept papers for advocacy initiatives and IEC material have been jointly developed with NGO partners and are in wide circulation.

WaterAid has participated in collaborative initiatives with the government and other agencies including the Water Supply and Sanitation Collaborative Council (WSSCC), the Water and Sanitation Programme (WSP) of the World Bank, UNICEF and DFID. Alliances are important for core programming concerns of rural and urban programming for water and sanitation, Integrated Water Resources Management and Networking with a range of government departments and government organisations, at the national and regional levels in India. WaterAid India is committed to making its own contribution to the MDG challenge and is open to exploring ways of partnering with all stakeholders for achieving water and sanitation for all.

India Country Office

WaterAid India
1st Floor, Nursery School Building
C-3, Nelson Mandela Marg
Vasant Kunj,
New Delhi - 110070
Tel: 0091-11-46084400
Fax: 0091-11-46084411

WaterAid Regional Offices

Regional Office East

Plot No. 1266,
Bhojnagar, Unit 9,
Bhubaneswar - 751022
Orissa
Telefax: 0674-2382262

Regional Office West

E7/846 Arera Colony
Bhopal - 462016
Madhya Pradesh
Telefax: 0755-4294724

Regional Office South

Rahat Residency
Gitanjali Paradise
#102, 1st Floor, Rahat Bagh
Nagavarpalya, Bangalore-560093
Karnataka
Telefax: 080-25240704



WaterAid – water for life

The international NGO dedicated exclusively to the provision of safe domestic water, sanitation and hygiene education to the world's poorest people.