**Ministry of Housing and Urban Affairs**
**Government of India**

# SUSTAINABLE CITIES INTEGRATED APPROACH PILOT IN INDIA

## Training and Assistance Need Analysis Report

### 2020-21

**BHOPAL**

gef

**UNIDO**
UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

**NIUA**
National Institute of Urban Affairs

**Ministry of Housing and Urban Affairs**
**Government of India**

# SUSTAINABLE CITIES INTEGRATED APPROACH PILOT IN INDIA

## Training and Assistance Need Analysis Report

For the provision of services and activities related to the delivery
of tailored training and relevant capacity building activities
to city managing authority of Bhopal

### Component 3:
Partnerships, Knowledge Management
and Capacity Building

## 2020-21

## BHOPAL

gef

**UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION**

**National Institute of Urban Affairs**

PROJECT TEAM
Ms. Paramita Datta Dey, Team Lead
Mr. Kaustubh Parihar, Project Associate
Ms. Tavishi Darbari, Research Associate
Ms. Sonali Mehra, Research Associate
Mr. Gaurav Thapak, Research Associate

DESIGN TEAM
Mr. Deep Pahwa, Creative Lead
Mr. Devender Singh Rawat, Senior Design Associate
Mr. Bhavnesh Bhanot, Senior Design Associate
Mr. Tehan Katar, Graphic Designer
Ms. Preeti Shukla, Design Associate

*Note- In this report Used Water is referred to as Wastewater

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Paramita Datta Dey
Team Lead

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# List of Abbreviations

| | |
|---|---|
| AE | Assistant Engineer |
| AMOH | Additional Medical Officer of Health |
| AMRUT | Atal Mission for Rejuvenation and Urban Transformation |
| AEE | Assistant Executive Engineer |
| BMC | Bhopal Municipal Corporation |
| C&D | Construction and Demolition |
| CE | Chief Engineer |
| CMOH | Chief Medical Officer of Health |
| DEE | Deputy Executive Engineer |
| EIA | Environmental Impact Assessment |
| EE | Executive Engineer |
| Env. Er. | Environmental Engineer |
| FSTP | Faecal Sludge Treatment Plant |
| GoMP | Government of Madhya Pradesh |
| IUWM | Integrated Urban Water Management |
| IEC | Information, Education and Communication |
| ICT | Information and Communications Technology |
| JE | Junior Engineer |
| MLD | Million Litres per Day |
| MT | Million Tonnes |
| MA&UD | Department of Municipal Administration and Urban Development |
| MHO | Municipal Health Officer |
| MoHUA | Ministry of Housing and Urban Affairs |
| NRW | Non-Revenue Water |
| NGOs | Non-Government Organizations |
| O&M | Operation and Maintenance |
| PHMED | Public Health & Municipal Engineering Department |
| PH | Public Health |
| SC-IAP | Sustainable Cities Integrated Approach Pilot Project |
| SWM | Solid Waste Management |
| SOPs | Standard Operating Procedures |
| SI | Sanitary Inspector |
| SS | Sanitary Supervisor |
| SE | Superintending Engineer |
| TANA | Training and Assistance Need Analysis |
| ULB | Urban Local Body |
| UGD | Underground Drainage |
| UNIDO | United Nation Industrial Development Organization |
| WS | Water Supply |

# 1

# INTRODUCTION

# 1. Introduction

## 1.1 About Sustainable Cities Integrated Approach Pilot

The Global Environment Facility (GEF) launched the Sustainable Cities Integrated Approach Pilot (SC-IAP) to help cities address the challenges posed by mega-trends (urbanization, rising middle class and population growth) of global environmental degradation in an integrated manner. UNIDO is one of the specialized agencies assisting countries in accessing GEF SC-IAP set aside funds, primarily building on the country allocations the focal areas of climate change and chemicals and waste. The SC-IAP programme currently engages 28 cities in 11 developing nations. UNIDO-GEF projects under this initiative include the Sustainable Cities Integrated Approach Pilot in India.

The United Nations Industrial Development Organization (UNIDO) implements the SC-IAP programme in India along with the Ministry of Housing and Urban Affairs (MoHUA). The core objective is to build resilience in five pilot cities – Jaipur, Bhopal, Mysuru, Vijayawada and Guntur – by integrating sustainability concepts into urban planning and management strategies. One key component is the identification of investment projects and technology demonstrations that encourage the development of low carbon urban infrastructure and help reduce greenhouse gas (GHG) emissions.

The main components of the project include:
**Component 1** - Sustainable urban planning and management; handled by UN-Habitat,
**Component 2** - Technology and investment support for innovative, low carbon pilot projects; handled by UNIDO, and
**Component 3** - Partnerships, knowledge management and capacity building, handled by NIUA.

## 1.2 Role of NIUA

The main role of NIUA is to undertake the implementation of Component 3 – Partnerships, Knowledge Management and Capacity Building. NIUA will contribute towards building the multi-sectoral partnership platform to ensure the implementation of sustainable city strategies, by understanding various issues and challenges of technical, financial, political, social stakeholders/partners. To solve these major issues and challenges, NIUA will prepare the integrated training curriculum modules for various stakeholders in five cities. These modules will help in the implementation of the projects in the pilot cities. The training program outcomes from these cities will then be scaled up to 25 Indian cities, which share similar scale and complexity of issues in implementing sustainable strategies.

## 1.3 About TANA

The Training and Assistance Need Analysis (TANA) is designed and developed in coordination with UNHABITAT and UNIDO. The TANA assessed the current status of the five cities in the field of sustainability, with particular reference to water, sanitation and solid waste management. The results were shared with UNIDO and UNHABITAT for review, approval and finalization.

The results of TANA will constitute the basis for a detailed training and technical assistance program. It will include the following:

1. Baseline status of current projects on Water, Sanitation and Solid Waste Management in five pilot cities
2. Baseline assessment of the current level of knowledge of stakeholders and their training needs
3. Collection of information from stakeholders in five cities through Semi Structured Interview (SSI), Focus Group Discussion (FGD), Personal Interviews (PI)
4. Corroborating, compiling and analysing data collected from various sources
5. Conducting validation and triangulation workshop on findings of TANA
6. Review and update of TANA findings in coordination with experts, UNIDO and UNHABITAT

Based on the results of TANA, the training curriculum on Solid Waste Management, Waste Water and Water Management will be developed by NIUA in close coordination with UNIDO and UNHABITAT. This will include the following tasks:

1. Based on TANA results, modules on water, waste water and solid waste management will be prepared for relevant stakeholders
2. For developing the module & pedagogy NIUA will synergize the experience of institutional and sector experts and trainers from relevant training institutes
3. Finalizing module in coordination with UN/experts/local resources/city officials.

As per prior experience in conducting capacity building workshops, it has been identified that one curriculum fails to achieve desired outcomes for different stakeholder groups due to their varied roles, responsibilities and aspirations. Hence, we seek to curate customised training sessions for various stakeholders. A tentative curriculum outline structure is shared as below in Figure 1 and Figure 2.



Figure 1: Curriculum Outline Development
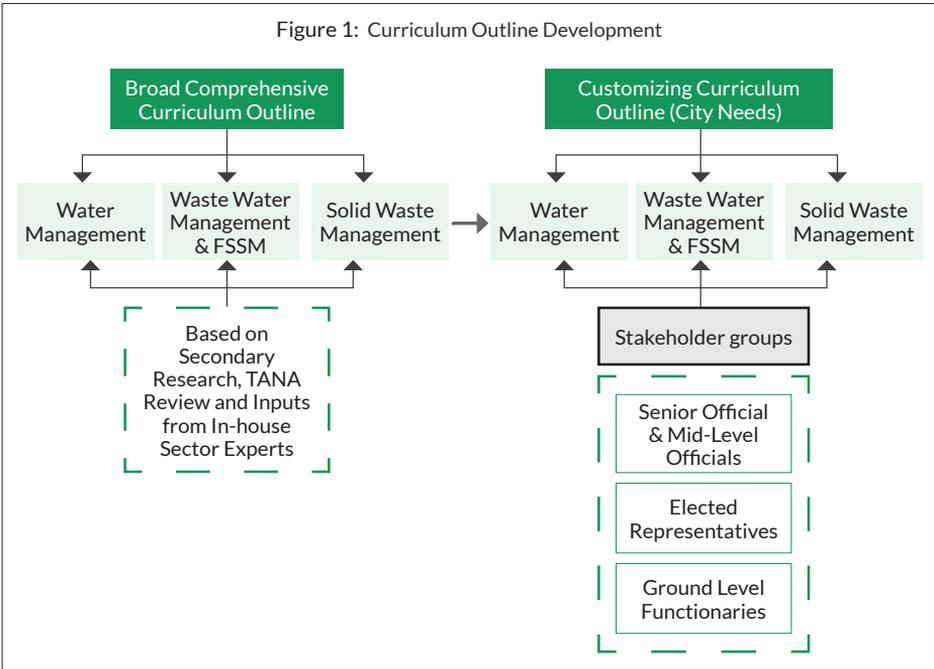
## Figure 2: Broad Curriculum Outline

| Chapter 1 | Overview | Chapter 5 | Project Management |
| Chapter 2 | Legislations, Policies and Programmes | Chapter 6 | Financial Management |
| Chapter 3 | Technical Concepts, Available Approaches and Technologies | Chapter7 | Stakeholder Engagement |
| Chapter 4 | Operation, Maintenance & Monitoring | Chapter 8 | Good Practices |
| Chapter 9 | Disaster Preparedness and Emergency Response | | |

# 2

# FRAMEWORK OF TRAINING AND ASSISTANCE NEED ANALYSIS
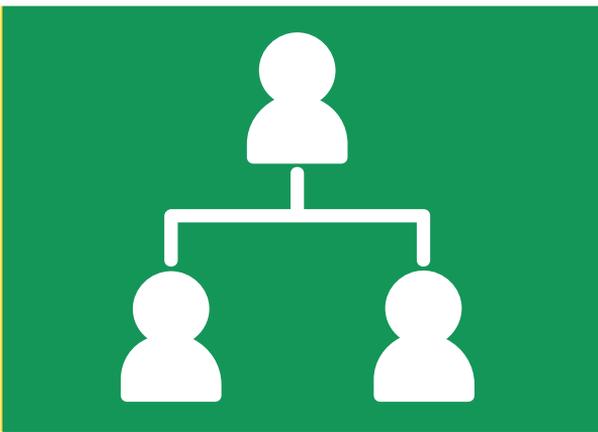
# 2. Framework of Training and Assistance Need Analysis
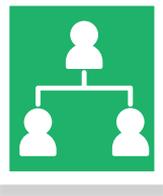
## 2.1 Objectives

The Training and Assistance Need Analysis (TANA) aims to understand the existing knowledge of the municipal corporation employees, across the hierarchy of the Urban Local Body (ULB). The findings of this study provide direction to the designing of the training curriculums customised for the needs of the five pilot cities. The specific objectives of the study are as follows:

1. To understand the focus of the ULB among the three sectors.
2. To understand the job roles of the officials, performed at various designations.
3. To determine the existing knowledge and understanding of the Municipal Corporation officials dealing with the three sectors at various designations.
4. To find the gaps in the existing knowledge of the ULB employees.
5. To determine the preferences of the ULB officials with respect to the content of the training programme.
6. To determine the preferences of the ULB officials for the training programme.
7. To provide a baseline understanding of knowledge to design the training curriculum.

## 2.2 Scope

With regards to this project, majorly ULBs are taken into account while trying to understand the needs of the city. The scope of this project spans over the three sectors of Solid Waste Management, Water Supply and Waste Water Management. The employees of the Municipal Corporations of the five pilot cities were interviewed. The assessment tries to cover the complete hierarchy of the employees, and hence, several members of Municipal Corporations at various

designations have been interviewed. Other parastatal agencies were also interviewed, with an intent to help city officials to plan, implement, operate and maintain sustainable city strategies and low carbon investment projects which are technically and financially viable.

## 2.3 Limitations

The interviews and primary data collection was anticipated to be done on-site in the five cities. However, the COVID-19 crisis and the lockdown that followed as a response to it disrupted the activities. It had a two fold impact- firstly, the transport services across the country were brought to halt thereby limiting the movement of people. Hence, the research team could not interact with the Municipal Corporations in person. Secondly, during the lockdown that continued for about 2 months, municipal services of Water, Drainage, Sanitation and Solid Waste Management were marked as essential services. As a result of this, the members of the Municipal Corporation that were planned to be interviewed were very occupied with their duties and responding to the crisis. Considering the circumstances, the interviews were conducted through video or audio conferencing and online mediums, coordinated with the City Representatives of UNIDO.

## 2.4 Structure of the Training and Assistance Need Analysis Report

This document has been structured into various chapters. Chapter 1 provides a basic understanding of the SC-IAP Project, a part of which is the TANA. Chapter 2 provides a framework for the TANA conducted, specifying the objectives of the analysis, defining the scope and the limitations of the process. Chapter 3 illustrates in detail the methodology adopted for the study. The following chapter is dedicated to one of the five pilot cities, providing the baseline status of the cities for the three sectors of Solid Waste Management, Water Management and Waste Water Management, followed by the stakeholder wise Training and Assistance Need Analysis findings. Chapter 5 provides a summary of the gap analysis and an outline of the curriculum that will be delivered in the city, according to the needs highlighted by various stakeholder groups. The Annexures at the end of this document can be referred to for the detailed questionnaires, followed by the Detail findings of TANA for Mid-level Officials of Bhopal.

# 3

## METHODOLOGY
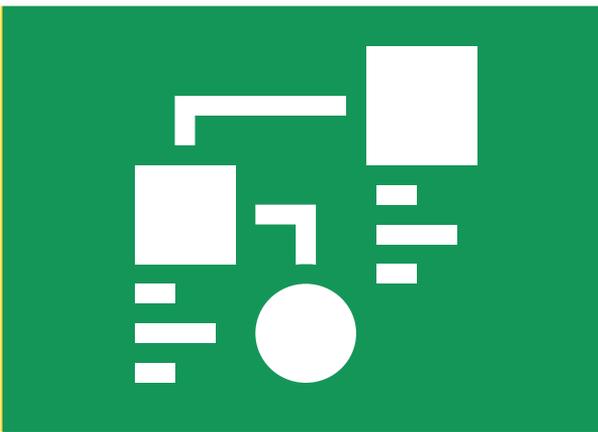
# 3. Methodology

For understanding the training needs of the Urban Local Bodies, primary and secondary research approach was adopted to gather data of the five pilot cities in the three sectors i.e. Water Management, Waste Water Management and Solid waste management. The results of TANA will constitute the basis for a detailed training and technical assistance program. TANA includes the following:

1. A Baseline compilation of the status and relevant projects of Water, Sanitation and Solid waste management in five pilot cities.
2. Gathering information from stakeholders through Structured and Semi-Structured Interview (SSI), Focus Group Discussion (FGD), Personal Interviews (PIs) about their understanding and preferences.
3. Baseline assessment of the current level of knowledge of stakeholders and their training needs.
4. Corroborating, compiling and analysing data collected from various sources.
5. Conducting validation and triangulation workshop on findings of TANA.
6. Review and update of TANA findings in coordination with UNIDO and UNHABITAT experts.

The methodology adopted in each of these sections is detailed in the following sections. Figure 3 details the process adopted to prepare the TANA. The first step in the process was to gather the secondary data from various sources and prepare a framework for the primary data collection.

## 3.1 Secondary Research

To understand different aspects of the target groups and to identify their training needs, a literature review of various existing TANA reports and a baseline study of each city was done. With the help of UNIDO representatives and from the review findings, stakeholder

mapping and sampling for each city were done which is explained in Figure 4. Considering various aspects of ULBs of each city, stakeholder mapping was formulated to streamline the stakeholders into three groups, viz., i.e. Senior officials, Mid-level officials and Ground-level Functionaries. After the Stakeholder grouping, a response matrix was created for the three sectors. Accordingly, sampling was done. This was followed by primary data collection, detailed in the following section.

## 3.2  Primary research

The Primary data collection included various research tools, depending on the requirements and needs of the stakeholder groups. In order to understand the training needs of senior officials, personal Interviews were conducted on virtual platforms like Microsoft-Teams, Zoom or conference calls. This was done as per the availability of the interviewees. Mid-level officials were interviewed through structured questionnaires whereas, a semi-structured questionnaire was used to conduct focus group discussions with ground-level functionaries.

## Figure 3: Methodology adopted for the TANA

**Secondary Reasearch**

Training and Need Assesment Review

| Review of Existing Need Assessment Reports | Identification of Sector-wise Priorities |
|---|---|

Baseline Studies of Pilot Cities

| Legislative Framework | Institutional Framework | City Status and Sector Specific Projects |
|---|---|---|

Understating the ULB

| Understanding basic issues of the Cities | Organisation Structure of ULB |
|---|---|

**Research Tools and Framework**

Stakeholder Identification

Questionnaire and Mode of Interaction Formulation

**Primary Research**

Interaction and Data Collection through Personal Interviews, Semi Structured Interview and Focus Group Discussions

**Data Analysis**

Gap and Need Identification

Identification of Stakeholder wise Preference and Training Priorities

**Curriculum Design**

Stakeholder wise Outline of Training Delivery

Designing City wise Customised Session of Training Delivery

Figure 4: Stakeholder Mapping
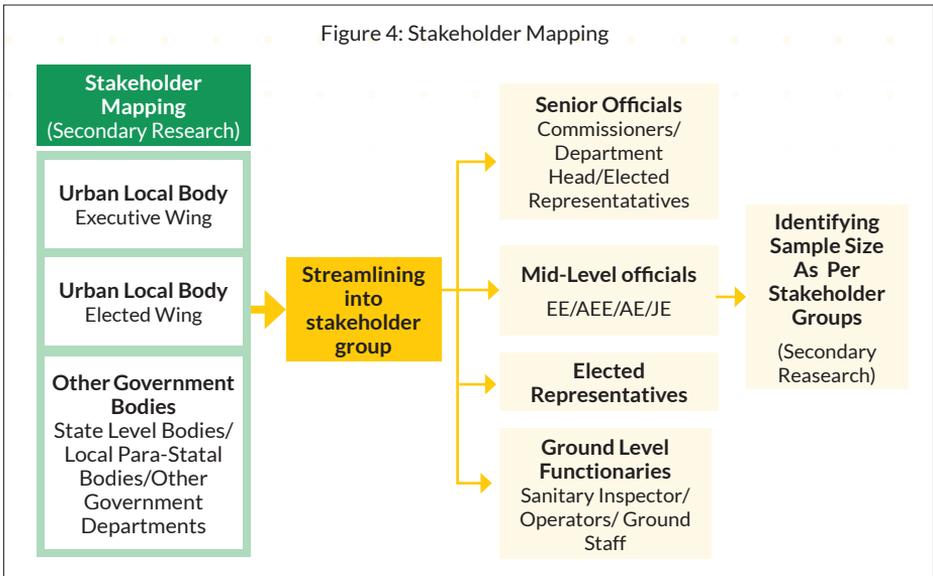
## 3.2.1 Research Instrument

For this study, three main data collection instruments were deployed to collect the data from the respondents. These are as follows:

1. Semi Structured Interviews (SSI) - These were used to interact with the senior officials to understand their needs and expectations of the project. It was done with the help of a few open-ended questions considering the limited time they have.

2. Personal Interviews and Individual Assessment- Personal Interview (PI) and Individual Assessment (IA) was used for interaction with the Mid-level Officials. The objective of the IA was to assess the gaps in their knowledge concerning the sector that they work in, while the PI attempted to understand the preferences of the respondents with respect to the training delivery medium.

3. Focus Group Discussions- Focus Group Discussion (FGD) was the mode of understanding the training needs of the ground-level functionaries. In cities where the language was different or the respondents did not understand Hindi and English, a local translator facilitated the FGD.

### 3.2.1.1 Research Questionnaires

To analyse the needs of the identified stakeholders from each functional group, customized questionnaires were prepared for each stakeholder group. Five sets of forms each dedicated to a specific stakeholder group were developed. The overview of the structure of the questionnaire set is depicted in Figure 5.

The questionnaires covered various aspects ranging from individual and professional details like the designation of the officials, their current job responsibilities and future demands for the post, their strengths and existing skill gaps and their needs and expectations from the training programs.

The questionnaires have been developed in consultation with in-house sector experts and city representatives from UNIDO to keep a check on the validity of the questions with respect to the context

Figure 5: Structure of Questionnaire

| | Figure 5: Structure of Questionnaire | | |
|---|---|---|---|
| **STAKEHOLDER GROUP** | DECISION MAKERS | MID-LEVEL OFFICIALS | GROUND-LEVEL FUNCTIONARIES |
| **DESIGNATIONS TO BE INTERVIEWED** | Commissioner/ Additional Commissioner<br><br>Elected Representatives<br><br>**Senior-Level Officials:** Supt. Engineer/ Executive Engineer/ Chief Engineer | Assistant Executive Engineer/ Assistant Engineer/Junior Engineer | Inspectors/ Operator/ Field Supervisors Helpers |
| **RESEARCH TOOL** | Personal Interview | Personal Interview | Personal Interview/ Individual Assessment | FGD |
| **FORMS** | FORM 1 | FORM 2 | FORM 5 | FORM 3 | FORM 4 |

| FORM 3.1 Water Management | FORM 3.2 Waste Water Management & FSSM | FORM 3.3 Solid Waste Management |
|---|---|---|

of the city. The questionnaire set was designed considering the clarity of the questions and the time needed for responding to the questions. Each questionnaire is provided with a brief description of the project.

For ethical approval, a consent form is also attached with the questionnaire which is read to the respondent before gathering any information. The interview is conducted only after the respondent has given his/her consent. Considering the limitations of the mode of interaction, consent was taken for recording the proceedings of the interview for documentation purposes. The approximate estimated time needed for conducting the interview is conveyed to the respondent at the outset. The details of questions covered under each form in the questionnaire are discussed in detail in the following sections.

## Form 1

Form 1 of the questionnaire set is specially designed for conducting a one-on-one structured or semi-structured interview with the stakeholder group of senior officials. The questions are framed to gauge the perspective of the decision-makers towards the capacity building needs of the officials and staff with respect to the three sectors of water, waste water and solid waste management.

| Figure 6: Structure of Form 1 | |
|---|---|
| **FORM 1** | |
| Q No | Expected Outcome |
| Q1 | Assessing priorities of the city for sustainable development in three identified sectors of water, waste water and solid waste management and also gauging the focus areas in the concerned sectors |
| Q2 | Assessing the capacity building needs of the senior, mid and ground level functionaries |
| Q3 | Assessing the capacity building needs for effective coordination with Elected Representatives |
| Q4-Q5 | Understanding city preparedness strategies during emergencies and assessing the capacity building needs for building resilience towards disasters and emergencies |

The assessment from Form 1 helped to understand the current status and future strategies of the city in water, waste water and solid waste management. This, in turn, would help assess the capacity buildings needs of the city officials for efficient performance. The overview of the form structure is explained in Figure 6.

## Form 2

Form 2 of the questionnaire set is designed for conducting a one-on-one structured or semi-structured interview with the senior officials under the stakeholder group of Decision Makers. The questions towards the senior officials and department heads are framed to understand the key focus areas of their particular departments and elicit their suggestions to improve the identified issues and challenges. The interview also helped in gauging the perspective of the senior officials towards the capacity building needs of their team of mid and junior officials and staff.

Assessment 2 helped to gauge the needs and expectations of each department working in the three sectors. It also helped to understand the current status of the city in each sector and the corresponding training needs. The overview of the form structure is explained in Figure 7.

| Q No | Expected Outcome |
|---|---|
| Q1 -Q2 | Identifying the key focus areas of the concerned sector and understanding strategies for strengthening the gaps in the identified focus areas |
| Q3 -Q4 | Assessing past training experiences, understanding the current needs and gauging expectations from future training programs |
| Q5 -Q6 | Assessing the capacity building needs for effective coordination with Elected Representatives and other stakeholders |
| Q7 | Identifying sector specific innovative and good practices adopted by the city |
| Q8 -Q10 | Understanding city preparedness strategies adopted during emergencies and assessing the capacity building needs for building resilience towards disasters and emergencies |
| Q11-Q12 | Sector specific questions assessing current status |

Figure 7: Structure of Form 2

FORM 2

## Form 3

Form 3 is designed for conducting a one-on-one interview with the mid-level officials of the various departments in each sector. The form has three sets - one for each sector i.e. water, waste water and solid waste management. Through this interview, information is elicited from various mid-level officials with respect to their current job responsibilities, their future aspirations and also their expectations from the training program. Since the mid-level officials have to interact with both the ground level functionaries and the senior officials for smooth functioning of the day-to-day tasks, understanding their training needs is essential for efficient service delivery.

The assessment from Form 3 helped to gauge the needs and expectations of the Mid-level Officials of each department working in the three sectors. The form is specially designed to help the officials assess their current level of understanding on various

aspects relevant to their job roles and in turn assess their needs for attending training for the same. The overview of the three sets of the form is explained in Figure 8.

Figure 8: Structure of Form 3

| FORM 3.1: Water | |
|---|---|
| Q No | Expected Outcome |
| Q1 -Q20 | Understanding respondent's profile, job responsibilities, expectations from training program and preferences with respect to training pedagogy |
| Q21-Q28 | Assessing respondent's level of understanding with respect to various aspects of their job responsibilities and corresponding training needs |
| Q27 -Q31 | Understanding city preparedness strategies adopted during emergencies and assessing the capacity building needs for building resilience towards disasters and emergencies |

| FORM 3.2: Waste Water (UGD) | |
|---|---|
| Q No | Expected Outcome |
| Q1 -Q19 | Understanding respondent's profile, job responsibilities, expectations from training program and preferences with respect to training pedagogy |
| Q21-Q28 | Assessing respondent's level of understanding with respect to various aspects of their job responsibilities and corresponding training needs |
| Q27 -Q31 | Understanding city preparedness strategies adopted during emergencies and assessing the capacity building needs for building resilience towards disasters and emergencies |

| FORM 3.3: Solid Waste Management | |
|---|---|
| Q No | Expected Outcome |
| Q1 -Q19 | Understanding respondent's profile, job responsibilities, expectations from training program and preferences with respect to training pedagogy |
| Q21-Q28 | Assessing respondent's level of understanding with respect to various aspects of their job responsibilities and corresponding training needs |
| Q27 -Q31 | Understanding city preparedness strategies adopted during emergencies and assessing the capacity building needs for building resilience towards disasters and emergencies |

## Form 4

Form 4 is designed for conducting a focus group discussion with the ground-level functionaries of the various departments in each sector. Through this focus group discussion, information with respect to their current job responsibilities, their future aspirations and also their expectations from the training program is assessed. Since the ground-level functionaries understand the issues and challenges at the ground level, understanding their perspective is essential for effective planning and implementation of any project.

The assessment from Form 4 helped to gauge the needs and expectations of the ground-level functionaries of each department working in the three sectors. The questions in the form are kept intentionally flexible to help gather anecdotal information from the ground- functionaries with respect to various issues and challenges faced on a day-to-day basis on various aspects. The overview of the form structure is explained in Figure 9.

## Figure 9: Structure of Form 4

| Q No | Expected Outcome |
|---|---|
| Q1 | Assessing the status of the service delivery in the given sector |
| Q2-Q3 | Assessing the capacity building needs for effective engagement with citizens |
| Q4 -Q5 | Assessing respondent's expectations from senior officials for effective service delivery |
| Q6 -Q7 | Understanding the challenges and issues faced by respondent with respect to day-day job responsibilities |
| Q8-Q13 | Assessing past training experiences, understanding the current needs and gauging expectations from future training programs |

## Form 5

Form 5 is specially designed for the elected representatives of the city. Since the elected representatives act as a link between the citizens and the Municipal Corporation, understanding their perspective and needs is essential. The questions are framed to gauge the perspective of the elected representatives towards the key focus areas for development in the city. The information gathered through this form would help identify the various activities currently being conducted by elected representatives in the city and the need for further support from citizens and other stakeholders. The assessment would also highlight the need and expectations of the elected representatives from the training program. The overview of the form structure is explained in Figure 10.

The questionnaires are attached as Annexures 1, 2, 3 and 4 at the end of this document. These questionnaires provided a template for the five cities. However, a few questions have been added or deleted depending on the context of the city. The information thus obtained was analysed following the methodology detailed in the following section.

| Figure 10: Structure of Form 5 | |
|---|---|
| **FORM5** | |
| Q No | Expected Outcome |
| Q1-Q2 | Assessing priorities of the city in three identified sectors of water, waste water and solid waste management and also gauging the focus areas in the concerned sectors and various issues in terms of service delivery |
| Q3-Q5 | Understanding respondent's role and their expectations from other stakeholders |
| Q6 | Understanding the expectations from the training program |
| Q7 | Understanding the respondent's perspective and suggestions towards city preparedness strategies during emergencies |

## 3.3 Data Analysis Methodology

After the interviews were conducted, the responses were tabulated in Excel worksheets. The Analysis was done separately for the identified stakeholder groups. The responses of the Senior officials, Ground Level Functionaries and the Elected Representatives were coded and qualitatively descriptively analysed, while the responses of the Mid-level Officials were analysed quantitatively.

The aim of the analyses was to understand the contents of the training considering the topics of interest and needs to conduct their roles more efficiently and effectively. Their requirements with respect to the mode and attributes of training delivery such as duration, language, location, etc. were also analysed. The results are quantified and described in the training findings for each city. A summary of training needs is prepared for each stakeholder, mentioned at the end of TANA of each city.

Based on the analyses and training findings, training priorities have been detailed for the Mid-level Officials for the three sectors of Water, Waste Water and Solid Waste Management. The tables at the

end of the chapters are a summary from the detailed tables of training priorities attached in Annexure 5. The Priorities have been marked as "High" if the majority of aspects under a particular parameter were preferred by the participants. The Priority has been marked as "Medium" if brief training was preferred by the respondents on about half of the aspects under a parameter. The Priority has been marked as "Low" if the respondents suggested no training is required for a parameter.

# 4

# BHOPAL – NEED ASSESSMENT AND FINDINGS

# 4. Bhopal – Need Assessment and Findings



## 4.1  City Profile

The city of Bhopal is the capital of the Indian state of Madhya Pradesh and the administrative headquarters of Bhopal district and Bhopal division. Bhopal is known as the "City of Lakes" for its various natural as well as artificial lakes and is also one of the greenest cities in India. Bhopal, with its central location is very well connected to all the parts of the country. With a municipal area of 463 sq. km, Bhopal stands among 15 largest cities of India. (BMC, 2020)

Under the Bhopal Municipal Corporation (BMC) limits, there are 85 wards divided among 19 zones. According to the Census of India 2011, BMC has a total of 1, 82,547 households and a population of about 1,798,218. There are 102,803 slums in the city housing 479,699 residents.

In past few decades, Bhopal has witnessed major transformation in the urban development sector. The city is known for its innovation in field of mobility (BRT Systems), public amenities (She-lounge facilities for women), heritage area (policy to conserve city's heritage). With well-planned Public Transport, Infrastructure, Institutes, Academic Hubs, IT Hubs, etc., Bhopal continues to maintain its title of "Green City", City of Heritage, City of Museums, and City of Lakes. (BMC, 2020) Also, Bhopal was selected as one of the first twenty Indian cities (the first phase) to be developed as a smart city under Smart Cities Mission. The annual Swachh Survekshan or the national cleanliness survey has also rated Bhopal as the cleanest capital city for 4 consecutive years, 2017, 2018, 2019 and 2020.

The city has a 'humid tropical season' having hot summers and cool winters. It receives moderate pouring of rain within the monsoon season (July – September), which varies yearly. The average temperature range of the city is 25° C - 30° C.

## 4.2  Status of Water, Waste water, FSSM and Solid Waste Management

The following sections present an overall scenario with numbers and statistics, of the city of Bhopal with respect to Water, Waste Water and Solid Waste Management.

### 4.2.1 Water

The city of Bhopal has a daily demand of 550 MLD of water split among domestic, industrial, agricultural and other needs, out of which, BMC supplies about 465 MLD per day. The water is withdrawn from Bhojtal Lake, Kolar Dam, Narmada River, Kerwa and remaining water demand is fulfilled from ground water (bore well). There are 2, 70,334 domestic connections in the city for water supply. Water is supplied for average 4 hour daily throughout the city. Bhopal region has in total 18 water reservoirs. (BMC, 2020)

It is proposed that the dependence on groundwater sources will be phased out and rainwater harvesting will be promoted. It is further proposed that recycle and reuse of water from industrial, institutional and large water consumers will be encouraged. At present about 67% of city's population is covered by piped water supply. The total area of water bodies which includes lakes, rivers and streams constitute 54.95 sq. km. which is 5% of the total planning area. Bhojtal commonly known as Upper Lake is the largest water body of city. (Directorate of Town and Country Planning, 2020)

### 4.2.2 Waste Water

The city generates about 240 MLD of wastewater daily. BMC area has about 314 km of non-contiguous underground sewer network serving about 28-30% population with a treatment facility of 90 MLD (BMC, 2020), rest of the entire sewer generated is either directly flows in to the open drains and nallahs.

Table 1: Existing STPs under BMC

| Sl. No. | Name and Location | Capacity (MLD) |
|---------|-------------------|----------------|
| 1 | Maholi Dhamkheda | 25 |
| 2 | Kotra | 10 |
| 3 | Badwai | 16.7 |
| 4 | Godarmau | 2.34 |
| 5 | Bawadia Kala | 13 |
| 6 | TT Nagar | 4.5 |
| 7 | Chunnabhatti | 8 |
| 8 | Barkheda Pathani | 4.5 |
| 9 | Piplani BHEK | 2.5 |

The sewer network in Bhopal has been executed under various development programs as indicated below:

1. Bairagarh Area – 16 km sewer with 2 pumping stations
2. Old Bhopal Area – 24 km sewer line with 5 pumping stations discharging sewage to Patra nallah
3. New Bhopal Area – 108 km sewer with 6 pumping stations
4. Bhoj Wet Land Project – 61.7 km sewer with 11 pumping stations
5. AMRUT

## 4.2.3 Solid Waste

As per the BMC reports, the city generates approximately 800-900 MT waste, of which 500 MT is wet waste and 400 MT is dry waste comprising recyclable and non-recyclable waste. Domestic hazardous waste is less than 1%. The door-to-door collection system covers 100% of the city. Around 200-250 rag pickers have also been hired by the BMC on contractual basis to segregate and collect waste (BMC, 2020). Segregated waste is collected by tricycles and auto-tippers from the households, markets and other generators. The waste is transferred to the transfer stations at 6 locations. The frequency of waste collection is at least once a day from the entire city and twice from the commercial and institutional areas including street sweeping waste collection at night.

A user fee of Re 1/day i.e. Rs 360/annum per household has been fixed by BMC, and Rs 500/month applicable for commercial areas less than 5000 sq. ft and Rs 1000/month for areas more than 5000 sq. ft.

Following are the main SWM projects under the BMC -

1. There are 6 operational decentralized modernized waste transfer stations in the city. Each transfer station has 2-4 capsules depending on the size of the transfer station.
2. There are 5 Bio-methanation plants installed across the city for wet waste in a decentralized manner. Their capacity is in the range of 5 MT each.
3. There are 3 Material Recovery Facility (MRF) in the city. Dry waste is segregated here manually into recyclables and non-recyclables. The decentralized plastic waste facility, handled by NGO Sarthak, is located at Bhanpura. The plastic waste facility was initiated in the year 2018 and has a capacity of 15 TPD.
4. A centralized compost plant is located at Adampur Chawani. The compost plant handles 300 MT of wet waste per day and has been operational since 2018.
5. The bio-remediation and scientific closure of the abandoned dump site at Bhanpura is to reclaim a parcel of the land from the existing foot print of the dump by shifting, compaction and profiling of MSW by scientific closure within a land of reduced foot print area with bio-remediation and processing of remaining waste to recover bio degradable waste and RDF material. The city of Bhopal disposes off its waste scientifically at the waste disposal facility located in Adampur Chawani. After processing of the waste, rejects are disposed in the landfill site. The site is spread over 45 acres approximately which has been operational for the past 2 years.

## 4.3  Legislative Framework

The government of Madhya Pradesh (GoMP) enacted the M.P. Nagar Tatha Gram Nivesh Adhiniyam, 1973, act for planning and urban development in the state. For giving the enforcement powers and permissions, the GoMP makes the rules under M.P. Bhumi Vikas Rules, 1984. (Department of Housing and Environment, 2020)

The Madhya Pradesh Municipal Corporation Act, 1956 was introduced for the larger urban areas. It formulated the establishment of Municipal Corporations in the large cities and laid down their rights and responsibilities, administrative, financial, and implementation powers (Urban Development and Housing Department, 2020). In 1983, BMC got the status of Municipal Corporation, under the provision of this act (BMC, 2020). As per the Act, BMC is mandated with the provision of urban services in Bhopal city and collecting charges/taxes for the same.

## 4.4 Institutional Framework

The State Urban Development and Housing Department is the nodal department at the state level and under which Urban Administrative and Development Department (UADD) is responsible for providing urban services in all cities and towns. The UADD allocates funds and provides policy directives for provision of urban services. UADD has deputed officials in BMC Health department and Water and Public Health and Engineering (PHE). Project planning of Solid Waste Management is done entirely by Health department at BMC and sent to the UADD for fund allocation as per requirement.

The PHED (Public Health and Engineering Department at state level) is mandated with the responsibility of design and execution of water supply and sewerage schemes throughout the state, which are handed over to the ULBs for operation and maintenance (Urban Development and Housing Department, 2020). In BMC, the Chief engineer (Water supply) is deputed from PHED department. As discussed with the officials, Water and Public Health and Engineering (PHE) department at BMC is in process to take handover from PHED department. Hence, all future planning and implementation will be done by BMC.

To understand the functional responsibilities with respect to planning, funding, implementation, O&M and monitoring of the services of the three sectors in Bhopal by various agencies, a mapping of responsibilities was done. This was helpful in customising the questionnaires for the agencies making it relevant to their functions. The Table 2 represents the mapping of responsibilities for the three sectors across agencies. Based on this mapping, it was found that BMC handles all the responsibilities concerning the three sectors within the city limits, in tandem with a few other state level agencies

Table 2: Responsibility mapping of agencies for the three sectors in Bhopal

| Agency name | Jurisdiction | Water Management and Drainage | Solid Waste Management |
|---|---|---|---|
| BMC | City Level | 🔴 🟡 🟢 🔵 | 🔴 🟡 🟢 🔵 |
| UADD, GoMP | State level | 🔴 | |

Key

🔴 Planning and Funding    🟢 Operation and Maintenance

🟡 Implementation / Execution    🔵 Monitoring

responsible for handling planning and financing of certain flagship and large scale projects. Therefore, for the needs assessment all the agencies were interviewed and BMC was assessed in detail.

The BMC has an executive body and an elected body. The elected body is headed by the Mayor and Executive Body by the Commissioner of the Municipal Corporation (BMC, 2020). The detail organogram of the BMC is described in Figure 11.

State and central government provides financial support to BMC to provide services and facilities in the municipal area. BMC has been involved in a variety of activities including, Citizens' Basic Services, implementation of various Development Projects (Social and Physical Infrastructure), Municipal revenue collection and Municipal Fundraising Ways. Some of the functions performed by BMC are as follows:

1. Coordination between all line departments and agencies involved in development
2. Ensuring efficient delivery of basic services like drinking water, sanitation, Roads, Street lights, Fire mitigation including disaster management etc. using Clean Technologies, Cost Efficient Methods and other Smart Initiatives.
3. Conservation and Beautification of the lakes, and structural heritage.
4. Planning, construction, up-gradation and maintenance of urban transport system, which includes Public Transport, Parking, and New Corridors (BRTS) etc.

Figure 11: Organization chart of BMC

**COMMISSIONER**

| General Administration | Water and PHE | Public relations and library | Health and Environment | Planning and Rehabilitation | Fire brigade and transport | Revenue and project | Electricity | Engineering | Accounting | Education, Social Justice, food and culture |
|---|---|---|---|---|---|---|---|---|---|---|
| Addl. Commissioner | Addl. Commissioner | Addl. Commissioner | Addl. Commissioner | Addl. Commissioner | Addl. Commissioner | Addl. Commissioner | Addl. Commissioner | Addl. Commissioner | Addl. Commissioner | Addl. Commissioner |

**General Administration**
- Law officer
- Deputy law officer
- Assistant Prosecutor
- Court agent
- Head clerk
- Upper division clerk
- Lower division Clerk
- Peon

**Water and PHE**
- Chief Engineer (Water Works)
- Executive Engineer (Sewerage)
- Deputy city Engineer
- Assistant Engineer
- Sub Engineer
- Clerk
- Fitter
- Plumber
- Electrician
- Pump attendant
- Pump operator
- Helper

**Public relations and library**
- Deputy Commissioner
- Public relation officer
- Assistant Public relation officer
- Library president in charge
- Reading room Incharge
- Clerk
- Peon

**Health and Environment**
- Deputy Commissioner
- Health Officer
- Veterinary officer
- Senior Health officer
- Health officer
- Sanitary supervisor
- Sanitary workers
- Lake conservation cell
- City Engineer
- Deputy city engineer,
- Health supervisor, Supervisor

**Planning and Rehabilitation**
- Chief town planner
- Encroachment officer in charge
- Assistant engineer
- Sub engineer
- Cartographer
- Assistant Cartographer
- Departmental accountant
- Tracer
- Supervisor
- Clerk
- Peon

**Fire brigade and transport**
- Fire officer
- Transport officer
- Assistant Fire officer
- Fire station officer
- Leading fireman
- Lower division clerk
- Mechanic
- Electrician
- Welder
- Painter
- Helper
- Fireman
- Driver
- Clerk
- Peon

**Revenue and project**
- Deputy Commissioner
- Deputy Revenue officer
- Department accountant
- Lower division Clerk
- Peon

**Electricity**
- City Engineer
- Deputy city Engineer
- Assistant Engineer
- Sub Engineer
- Lower division clerk
- Wireman
- Helper

**Engineering**
- City Engineer
- Deputy city Engineer
- Assistant Engineer
- Sub Engineer
- Department accountant
- Lower division Clerk
- Peon

**Accounting**
- Assistant Dean
- Main Record officer
- Record officer
- Upper division clerk -Lower division clerk
- Peon

**Education, Social Justice, food and culture**
- Assistant commissioner
- Assistant revenue
- Departmental accountant
- Lower division clerk
- Peon

5. Work as Ex-Officio Board of Directors, Bhopal City Link Limited (City Transport SPV) which ensures commercial operation of Public transport (Inter City Bus Service, Intra City Bus System, Intra City Public Taxi Service, etc.)

6. Implementation of projects sanctioned under JNNURM, ADB assisted Project UDAY, Housing for all, and Implementation of DFID assisted MPUIIP, Rajiv Awas Yojana, Chief Minister Urban Infrastructure Development Scheme, Various PPP Projects (Multilevel Parking etc.).

7. Regulatory works like Building Permission, Development Permission, and Encroachment removals.

8. Computerized Municipal Processes through SAP-ERP based Municipal Administration System, Support to District Administration in Municipal Area Expansion Mapping and Demography based Regularization of Ward Boundaries.

### 4.4.1 Water and Public Health and Engineering (PHE) Department

This Department is headed by Chief Engineer. The Chief engineer reports to the Additional Commissioner of the water and PHE department. There are two cells in Water and Public Health and Engineering (PHE) Department; Water works and PHE cell. Water works cell is responsible for administration and coordination of water supply operations, allocate funds to various water-related projects and collect revenues through water charges. The PHE cell is responsible for all the engineering and technical matters related to water supply and operation and maintenance of Underground Drainage (UGD).

In Water works, Chief Engineer coordinates the overall activities in the cell. Deputy City Engineers oversee the implementation of projects. Assistant Engineer and Sub-Engineer are responsible for the implementation of engineering activities assigned in their respective zones and supervise the work at ground level. In PHE cell, Executive Engineer oversee the overall activities of the cell. Deputy City Engineer oversees the sewer network and waste treatment projects.

### 4.4.2 Health and Environment Department

Solid Waste Management (SWM) is under the purview of Health and Environment Department. Its engineering section is responsible

| SECTOR | WATER AND WASTE WATER | | SOLID WASTE MANAGEMENT | |
|---|---|---|---|---|
| DEPARTMENT | WATER AND PUBLIC HEALTH & ENGINEERING DEPARTMENT | | HEALTH AND ENVIRONMENT DEPARTMENT | |
| CELL | WATER WORKS | SEWERAGE | ENGINEERING | PUBLIC HEALTH |
| DEPARTMENTAL HEAD | Additional Commissioner | Additional Commissioner | Additional Commissioner | Additional Commissioner |
| DEPARTMENT | Chief Engineer | Executive Engineer | City Engineer | Deputy Commissioner |
| | Deputy City Engineer | Deputy City Engineer | Deputy City Engineer | Senior Health officer |
| | Assistant Engineer | Assistant Engineer | Assistant Engineer | Health officer |
| | Sub Engineer | Sub Engineer | Sub Engineer | Sanitary Inspector |
| | Ground Staff | Ground Staff | Ground Staff | Ground Staff |
| DUTIES | Extraction, Treatment and supply of Water | Conveyance and treatment of Waste Water | Involved in infrastructural activities related to SWM projects | Collection, Transportation and Disposal of Solid Waste, Sweeping |

Figure 12: BMC Water, Waste Water and SWM Departments

for infrastructural development activities related to SWM. Public Health (PH) cell is responsible for segregation, collection, treatment and road sweeping. This department is headed by the Deputy Commissioner. The Deputy Commissioner reports to the additional commissioner. Deputy Commissioner oversees the implementation of sanitation and SWM activities through Health officers and Sanitary Inspectors (SIs). Each SI has Deputy Sanitary Inspectors (zone wise) under him/her and each Deputy Sanitary Inspectors has 10-20 sanitary workers (field workers) for collection, sweeping and cleaning in their respective allocated areas. Each SI allocates areas to each Deputy Sanitary Inspectors and allocates works on a daily basis (based on complaints received from public and/or instructions from higher ups) apart from regular sanitation. SIs inspect the work of DSIs and Sanitary workers on a daily basis and report to Health Officers. Figure 12 shows the sectoral organization and their duties in BMC.

## 4.5 Stakeholder Mapping

Based on the organogram of the BMC, stakeholders were identified for providing training and technical assistance in the field of Water, Waste Water Management and Solid Waste Management. The two

concerned departments are Water and PHE Department and Health and Environment Department. The executive staff of BMC are divided into 3 stakeholder groups, viz. Decision makers, Mid-level Officials, and Ground- level functionaries.

1. The decision makers involve the Commissioner of BMC, and the heads of the department (Additional Commissioners, Deputy Commissioners, Chief Engineer, Executive Engineers and City Engineers) responsible for the management of Water, Waste Water and Solid Waste.
2. The Mid-level Officials comprise the Deputy City Engineers (DCE), Assistant Engineers (AE), Sub engineer (SE), Health officers (HO), Sanitary Inspector, Deputy Sanitary Inspectors etc.
3. The ground- level functionaries include all the field staff and members of BMC working as Time keeper, Fitters, Valve man, Plumbers, UGD Operators, sanitary workers, etc. Figure 88 shows the stakeholder groups for the BMC.

According to the stakeholder groups, various questionnaires were prepared in consultation with sector experts and city representatives from UNIDO and UNHABITAT.

A response matrix was prepared, mapping the stakeholder groups and the mode of interaction with the interviewees. Due to the national lockdown and hectic schedule of the officials, online interviews were conducted as per their availability. Table 3 shows the total number of interviews conducted from each stakeholder group.

Table 3: Total number of interviews conducted from each stakeholder group

| Form Number | Stakeholder Groups | Mode of Interaction | Number of Interviews Conducted |
|---|---|---|---|
| Form 1 | Decision Makers | Personal Interview | 4 |
| Form 2 | | | |
| Form 3.1 | Mid-level Officials | Individual Assessment | 9 |
| Form 3.2 | | | |
| Form 3.3 | | | |
| Form 4 | Ground- Level Functionaries | Focus Group Discussion<br>Personal Interview | 11<br>1 |

Figure 13: Stakeholder groups for BMC

| STAKEHOLDER GROUP | DECISION MAKERS | MID-LEVEL OFFICIALS | GROUND-LEVEL FUNCTIONARIES |
|---|---|---|---|
| DESIGNATIONS INTERVIEWED | **Commissioner**<br><br>**Senior Level Officials:**<br>Addt. Comm., Deputy Comm., Asst. Comm., Chief Engineer, Executive, City Engineer | **Mid-Level Officials:**<br>Deputy City Engineer, Assistant Engineer, Sub Engineer, Sanitation Inspector, Health officer, Sanitary inspector, Supervisor | **Ground and Field Staff:**<br>Inspector, Operator, Helper |
| DEPARTMENT | Water and PHE | | |
| | Health and Environment | | |
| CELL | Water works   Public Health | Water works   Public Health | Water works   Public Health |
| | Sewerage   Engineering | Sewerage   Engineering | Sewerage   Engineering |
| RESEARCH TOOL | Personal Interview | Individual Assessment | Focused Group Discussion |
| FORMS | FORM 1     FORM 2 | FORM 3 | FORM 4 |
| | Form 3.1 Water Management | Form 3.2 Waste Water Management & FSSM | Form 3.3 Solid Waste Management |

## 4.6  Training Needs Key Findings

The findings of the TANA study have been categorised stakeholder wise and mentioned below. The detail findings of TANA have been represented at the end of this document as annexures.

## 4.6.1 Training Needs- Decision Makers in Executive body of ULB

The executive body of the BMC is headed by the Commissioner. The Commissioner is assisted by Additional Commissioners, Chief Engineers, Executive Engineers, Deputy Municipal Commissioners City Engineers and Zonal Supervisor to supervise and coordinate the various functions of the Corporation. The findings of the interviews are as below.

### 4.6.1.1 Commissioner

Due to unavailability of the Commissioner, the Additional Commissioner was interviewed as a representative head of the executive body of BMC. Mr Shashwat Meena, the Additional Commissioner of BMC mentioned that for Bhopal Solid Waste Management is the top most priority sector that needs improvement. This was followed by Waste Water management and lastly water management.

### 4.6.1.2 Department Heads

Online interviews were conducted with the heads of Water and Public Health Engineering department; Health and Environment Department to understand their needs and the assistance they seek in management and monitoring of services of BMC for Water Supply, Sewerage and Solid Waste Management.

### Water and PHE Department

The Water works cell is headed by Chief Engineer who reports to the Additional Commissioner. The Engineer is assisted by Deputy City Engineers to manage and monitor the water works on daily basis. The PHE cell is headed by the Executive Engineer who reports to the Additional Commissioner. Executive Engineer is responsible for operation and maintenance of sewer networks and wastewater treatment works.

### Water works Cell

A personal interview was conducted with Mr. A. R. Pawar, the Chief Engineer (water works) to understand his training needs and also assess the training needs of his officials and staff members to help build their capacities for better and efficient work performance. During the interview, Mr. Pawar explained the need for training at both micro and macro level for efficient management of daily activities. The following are the findings of the training and needs assessment of the interview.

### Training Needs for the Senior-level Officials

The prime responsibility of the senior level officials is to handle water supply and treatment, project designing and management works. In this context, Mr. Pawar emphasized on training that would provide exposure to latest available technologies and approaches (case based examples). He also emphasized the need for training on

Financial Sustainability of the projects and a module on Integrated Urban Water Management (IUWM) to help prepare a sustainable plan for the city.

Mr. Pawar further suggested that the senior officials are also concerned with pipeline laying and continuous pipeline networks. Hence, a comprehensive module that builds the capacity of the officials for improving the day to day handling and management of work would be beneficial.

### Training Needs for the Mid-level Officials

For the Mid-level Officials, Mr. Pawar recommended training covering aspects of Operation and Maintenance, Water Quality standards, execution of water pipeline works, and new available technologies.

### Training Needs for the Ground-level Functionaries

For the junior level staff in the water supply cell, basic understanding of the day-to-day O&M works was one of the prime training need highlighted by Mr. Pawar. He also suggested that the training should provide basic understanding of the water supply systems.

Table 4 below provides an overview of the training needs assessed across the water works cell in the BMC, per the discussion held with Chief Engineer.

Table 4: Summary of findings of Training Needs based on the interview with the Chief Engineer, BMC

| STAKEHOLDER | GAPS IDENTIFIED | TRAINING NEEDS | TRAINING MODE | TRAINING MEDIUM |
|---|---|---|---|---|
| Decision makers | Planning and Monitoring (new available technologies) | Build awareness on latest available technologies and approaches; Enhance technical skill and knowledge; Understand concepts of IUWM, financial sustainability | Online | Hindi |
| Mid-level Officials | Day to day operation and maintenance, new available technologies | Operation and Maintenance, execution of works, and applied engineering. | Online (Case Study Based) and On-site | Hindi |
| Ground-Level Functionaries | Execution, Skills and knowledge | Training to enhance skills to perform day to day duties efficiently | On-site Training/ off-site | Hindi |

### Public Health and Engineering Cell

For sewerage works, a personal interview was conducted with Mr. Santosh Gupta, Executive Engineer to understand his training needs and also assess the training needs of his officials and staff members to help build their capacities for better and efficient work performance. During the interview, Mr. Gupta explained the need for training at both micro and macro level related to daily activities for efficient management. The following are the findings of the training and needs assessment of the interview with the Executive Engineer of the Bhopal Municipal Corporation.

### Training Needs for the Senior-level Staff/officials

One of the key responsibility of the senior level officials is project designing and day-to-day operation. They are also involved in overall planning for sewer networks. For the Sewerage cell, Mr Gupta suggested trainings for enhancing the understanding and knowledge of the Sewer network systems, new treatment technologies and also exposure to the Faecal Sludge and Septage Management (FSSM).

### Training Needs for the Mid-level Staff/officials

For the mid-level officials of Sewerage cell, i.e. for the staff up to the Sub Engineer level, Mr. Gupta recommended trainings covering aspects of operation and maintenance, execution of works and new available technologies in waste water treatment and also exposure to FSSM.

### Training Needs for the Ground-level Staff/officials

For Desludging operators in Sewerage cell, Mr Gupta suggested training covering basic understanding of the day-to-day O&M works and health and safety (SOPs) of the workers.

Table 5 below provides an overview of the training needs assessed across the Sewerage cell in the BMC per the discussion held with the Executive Engineer.

### Health and Environment Department

In BMC, the Public Health Cell is responsible for Solid Waste Management, led by the Deputy Commissioner, who looks after the activities of collection, transportation, treatment and disposal of waste in the city. The engineering cell is responsible for all

Table 5: Summary of findings of Training Needs
based on the interview with the Executive Engineer, BMC

| STAKEHOLDER | GAPS IDENTIFIED | TRAINING NEEDS | TRAINING MODE | TRAINING MEDIUM |
|---|---|---|---|---|
| Decision Makers | Planning and Monitoring (new available technologies); Project Management | Build awareness on latest available technologies and approaches; Enhance technical skills and knowledge; Understand UGD network systems and their monitoring, FSSM | Online (Case Study Based) and On-site | Hindi |
| Assistant Executive Engineers | Operation and Maintenance, Awareness and exposure on new advance technologies | Training on Operation and Maintenance, execution of works, and applied engineering, FSSM | Online (Case Study Based) and On-site | Hindi |
| Ground-Level Functionaries | Execution, Skills and knowledge | Training to enhance skills to perform day to day duties efficiently, Health and Safety | On-site Training / off-site | Hindi |

infrastructure related activities in solid waste management. The City engineer, who reports to the Additional Commissioner, leads this wing.

## Training Needs for the Senior-level Staff/officials

Personal interviews were conducted with Mr. Shashwat Meena, Additional Commissioner and Mr. Harshit Tiwari, Deputy Commissioner. They suggested the need for training on the overall understanding of the SWM Value chain supported by examples of good practices from Indian cities, innovations and exposure to PPP models in SWM.

## Training Needs for the Mid-level Staff/officials

In addition to the above, they recommended that the training for their subordinate team members should lay emphasis on enhancing their performance related to operation and maintenance. Training covering aspects of operation and maintenance, detailed exposure of SWM value chain and new available technologies and innovations in SWM. These suggestions were particularly relevant for the Deputy Sanitary Inspectors and those working with them.

Table 6: Summary of findings of Training Needs of officials of BMC, SWM Cell

| STAKEHOLDER | GAPS IDENTIFIED | TRAINING NEEDS | TRAINING MODE | TRAINING MEDIUM (Language) |
|---|---|---|---|---|
| Decision Makers | Planning and Monitoring (new available technologies); Project Management | Exposure to the Best Case study models from Indian Cities, Build awareness on latest available technologies and approaches, SWM PPP Models | Online (Case Study Based) and On-site | Hindi |
| Assistant Executive Engineers | Awareness and exposure on new advance technologies | Training on Overall SWM Value Chain aspects, new available technologies and innovations in SWM, Operation and Maintenance | Online (Case Study Based) and On-site | Hindi |
| Ground-Level Functionaries | Execution, Skills and knowledge | Training to enhance skills to perform day to day duties efficiently, Communication skills, Behavioural Change tools and Health and Safety | On-site Training / off-site | Hindi |

### Training Needs for the Ground-level Staff/officials

The ground level sanitary workers in SWM cell suggested training covering basic understanding of the day-to-day O&M works, tools related to behaviour change and communication and public interaction. They emphasized on demonstration of various methods of home composting.

Table 6 above provides an overview of the assessment of the training needs of the officials in BMC dealing with Solid Waste management. It is based on the discussions held with the Additional commissioner and Deputy Commissioner.

## 4.6.2 Training Needs- Mid-level Officials

The senior officials and the heads of the departments depute work to the Mid-level Officials. The Mid-level Officials include the Assistant Engineer, Sub Engineer, Health Officer, Sanitary Inspector, and Deputy Sanitary Inspector. They were assessed through personal interviews. This was done separately for the three sectors - Water Supply, Waste Water and Solid Waste Management. The questionnaire (refer Annexure 3. ), has the three parts – the first one is on the respondent's educational profile and institutional affiliation. The second part aims to understand the general preferences of the respondents with respect to training delivery. The third part

deals with sector specific parameters like technical knowledge and preferences, project and financial management etc. The findings of the survey have been mentioned sector wise, in the following sub-sections.

### 4.6.2.1  Water Supply

The mid-level staff members of the water works department dealing with the water supply were assessed on their knowledge and training needs with respect to legislative and institutional aspects and technical and engineering aspects of water supply systems. In addition, their knowledge on financial management, community engagement and project management was also investigated. This was done keeping in mind their responsibilities and job roles. Based on the assessment, the gaps in their skill sets and training priorities were identified. A brief description of the respondents' profile is discussed below.

### Age wise Classification

Three age groups were identified among the respondents; those under 30 years, 41-50 years and 51-60 years. BMC has comparatively new staff on permanent roles i.e. Assistant Engineers, Sub engineers, Junior Engineers, appointed through state engineering services. The second prominent age group is that of the senior cadre of officials in BMC, those at the position of Chief Engineer, Executive Engineers, Deputy City Engineers, etc. Figure 14 shows the age wise composition of the respondents at BMC.



Figure 14: Age group composition of the Mid-level Officials

33% 51-60
33% 41-50
34% <30
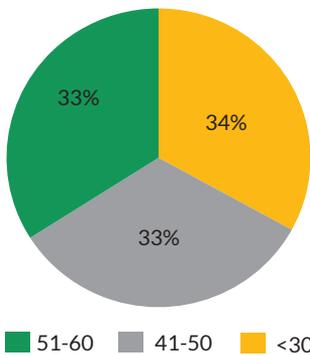


Figure 15: Educational Background of the Mid-level Officials

67% Bachelors
33% Diploma
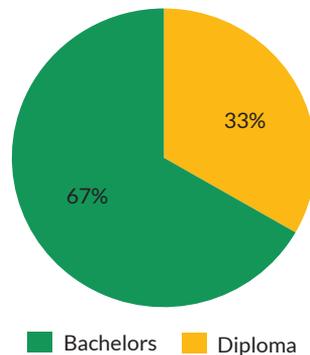
## Educational Background

Most officials in BMC have a Bachelor's degree in engineering. There was a major share of bachelor's degree holder and diploma holders among the respondents. Figure 15 shows the educational background of the respondents at BMC in Water Supply Sector.

## Years of Service

The Bhopal Municipal Corporation staff comprises mostly young people. The engineers interviewed had an experience of less than five years. These people are Assistant Executive Engineers. The senior officials are mostly Deputy City Engineers. Figure 16 shows the work experience profile of the Mid-level Officials in water supply at the BMC.

## Job Responsibilities

Most officials working in the mid-level in the Water Supply department at BMC have to deal with technical and engineering aspects. They also conduct field supervisions, engage with the public and address their complaints. Their responsibilities also include staff management, coordination with officials and staff, planning and scheduling. Figure 17 shows the job roles taken up by the respondents in water supply at BMC.

The profile of the respondents was analysed to customize the training module corresponding to their job responsibilities and personal attributes. The findings of the need assessment have been discussed below.



Figure 16: Total year in service of the Mid-level Officials

33%

67%

■ 1-5 years
■ Above 15 years
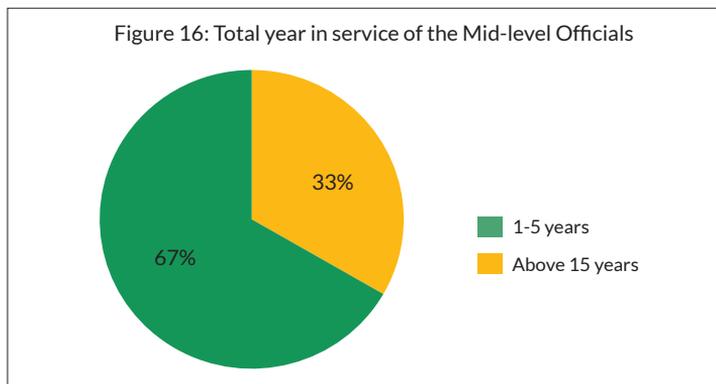
Figure 17: Job Responsibilities of the Mid-level Officials in Water Supply
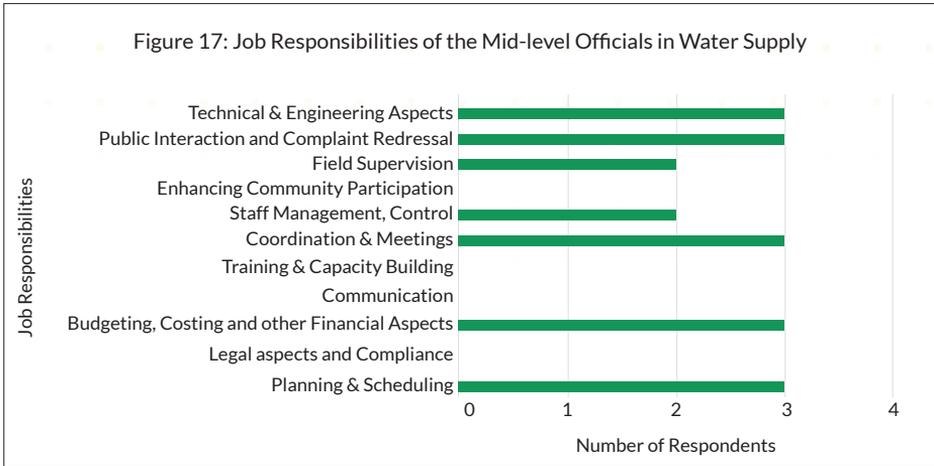
## Sector Specific Assessment

The respondents were assessed on their knowledge and understanding of the five domains concerning with water supply, that is institutional and legislative framework, technical and engineering aspects, financial management, community engagement, and project management. In addition to this, their understanding of the city resilience for disasters and emergencies was recorded. The respondents were asked to prioritize their training needs based on these five domains. The detail findings of analysis has been mentioned in the Annexure 5.

### Institutional and Legislative Framework

The assessment showed that the respondents had a fair understanding of the institutional and legislative frameworks. As this is not relevant to their job role, training is not required.

### Technical and Engineering Aspects

Technical aspects are highly relevant to the job role of this group of respondents. The assessment showed that the officials have a fair understanding of these subjects. They showed a keen interest to know more and expressed the desire to know more about latest and advanced technologies in the water sector.

### Financial Aspects

The Mid-level Officials do not have to deal with financial aspects. The assessment showed that the officials have limited understanding of these subjects. However, for their knowledge enhancement they expressed the desire for a training on the financial models in infrastructure projects.

### Community Engagement

Community engagement is one of the skills required in their job profiles. Though most officials have a fair understanding of such tools, they would like to improve their knowledge and enhance their skills in this aspect.

### Project Management and Private Partnerships

Most of the respondents felt the need for training in DPR evaluation, tendering and procurement process and project management. The assessment indicated a fair understanding of the subjects.

### Disaster and Emergency Preparedness and Response

To the questions pertaining to the emergency preparedness and response of the city, all the respondents said that the city is not well prepared for any disasters or emergency. However, the city administration's response in COVID-19 crisis was quite good.

The findings of TANA for the Mid-level Officials working in Water Supply Cell has been summarized in Table 7.

Table 7: Summary of Training Needs for Mid-level Officials in Water Supply Sector

| Domains/ Aspects | Training Need |
| --- | --- |
| Institutional and Legislative Framework | Yes. A brief session was suggested by the respondents covering few important parameters under this domain. |
| Technical and Engineering Aspects | Most have a fair understanding of the subject. Would require sessions on new technologies and concepts. |
| Financial Management | Yes. A brief session on financial planning of infrastructural projects and cost recovery and efficiency will be required. |
| Community Engagement | Yes. Most have a fair understanding of the subject. |
| Project Management and Private Partnerships | Yes. A brief session only covering the DPR preparation, tendering and procurement and project management and monitoring aspects. |

### 4.6.2.2  Waste Water

The mid-level officials of the water and PHE department dealing with the sewerage works were assessed on their knowledge and training needs with respect to legislative, institutional technical and engineering aspects and FSSM. In addition, their knowledge on financial management, community engagement and project management were also evaluated. Based on the assessment, the gaps in their skill sets and training priorities were identified. A brief description of the respondents' profile is as below. Since the Mid-level Officials are all newly recruited, all the interviewees had similar characteristics.

### Age wise Classification

All the respondents interviewed were below the age of 30. They are working as Assistant engineers and Sub engineers on permanent roles.

### Educational Background

All the respondents have bachelor degree in engineering.

### Years of Service

All of the respondents were young with an experience of 5 year or less.

### Job Responsibilities

Most officials said that field supervision, technical and engineering aspects are the main responsibilities of their job role. They are also involved in resolving complaints, coordination and communication with staff members. Figure 18 shows the key responsibilities of the Mid-level Officials in sewerage cell of BMC.

Figure 18: Job responsibilities of the Mid-level Officials in Waste Water
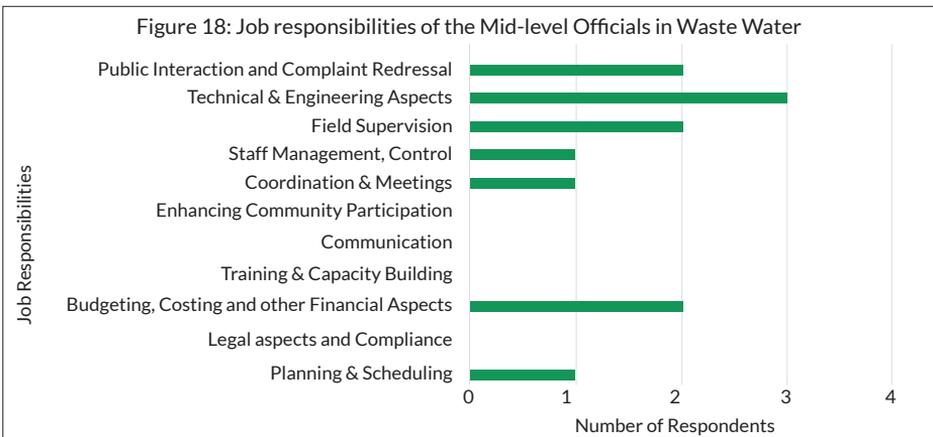
## Sector Specific Assessment

This section deals with the various aspects of sewerage works at BMC. The respondents were assessed on their knowledge and training needs with respect to the institutional and legislative framework, technical and engineering aspects and FSSM. In addition, their knowledge on project and financial management and community engagement was also recorded. Based on the evaluation, the gaps in their skill sets and training priorities under six aspects were identified. The detail findings for the mid-level staff and the methodology of analysis has been mentioned in the Annexure 5. .

### Institutional and Legislative Framework

All the respondents had a fair understanding of legislative and institutional framework pertaining to the Waste Water Sector. Training would be required on latest missions and schemes.

### Technical and Engineering Aspects of Waste Water Management

Most of the respondents had a fair understanding of the technical and engineering aspects and it is highly relevant to their job roles. However, the respondents the need for training on the new technologies.

### Faecal Sludge and Septage Management

The respondents had a fair understanding of the FSSM aspects and it is highly relevant to their job roles as well. However, they also require training on the technologies aspect.

### Financial Management

Almost no respondents have to deal with financial management of the projects. Therefore, no training would be required in this area.

### Community Engagement

Community engagement is not relevant to their job role. Therefore, no training would be required.

### Project Management and Private Partnerships

At the time of interview, officials mentioned that sessions on topics pertaining to project management would help in efficient working. Most of them had a poor understanding of the topics.

Table 8: Summary of Training Needs for Mid-level Officials in Waste Water sector at BMC

| Domains/ Aspects | Training Need |
|---|---|
| Institutional and Legislative framework | Yes. A brief session was suggested by the respondents covering few important parameters under this domain. |
| Technical and Engineering Aspects | Most have a fair understanding of the subject; Would require sessions on new technologies and concepts. |
| FSSM | Yes. A detailed session on FSSM value chain |
| Financial Management | No. This is not relevant to their job. |
| Community Engagement | No. All have a fair understanding of the subject. |
| Project Management and Private Partnerships | Yes. A brief session only covering the project management and monitoring aspects. |

Table 8 summarizes the findings of TANA for the Mid-level Officials working in wastewater management.

### 4.6.2.3  Solid Waste Management

The mid-level staff members of the Health and Environment department dealing with the SWM were assessed on their knowledge and training needs with respect to legislative and institutional frameworks and technical and engineering aspects. In addition, their knowledge on financial and project management, community engagement and private partnerships was also evaluated. Since the SWM works is under Health department, staff members (Health officers, Sanitary Inspectors, and Deputy Sanitary Inspectors) from the departments were interviewed. Based on their knowledge assessment and the gaps in their skills, training priorities were identified. A brief description of the respondents' profile follows.

### Age Wise Classification

More than 60% of the respondents were below 30 years of age. These people are Sanitary Inspectors and Deputy Sanitary Inspectors. Figure 19 shows the composition of age groups of people interviewed.

### Educational Background

Most of the respondents have master degree and few of them have a bachelor degree as their highest qualification. Figure 20 shows the composition of educational backgrounds of the respondents concerning SWM at BMC.

## Figure 19: Age group composition of the Mid-level Officials

33%

67%

■ <30   ■ 41-50
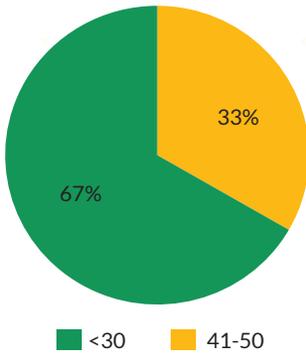
## Figure 20: Educational Background of the Mid-level Officials

33%

67%

■ Master   ■ Bachelors
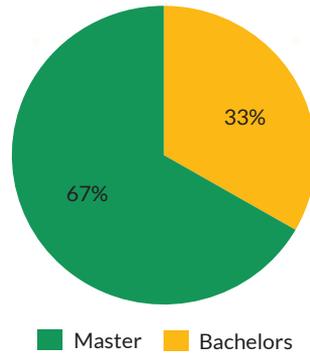
## Figure 21: Total year in service of the Mid-level Officials

33%

67%

■ 1-5 years

■ Above 15 years
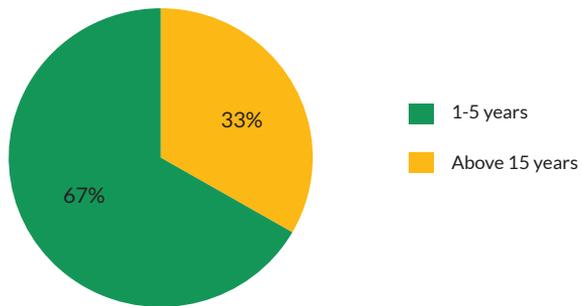
## Years of Service

As most of the respondents were young, they had an experience of 5 years or less. Figure 21 shows the composition according to the years of service of each respondent.

## Job Responsibilities

All the respondents' interviewed in the SWM sector mentioned that field supervision, public interaction, complaint redressal, coordination and meetings are important part of their job. They are also engaged in technical, engineering and community participation aspects of the SWM process.

Figure 22: Job Responsibilities of the Mid-level Officials in SWM
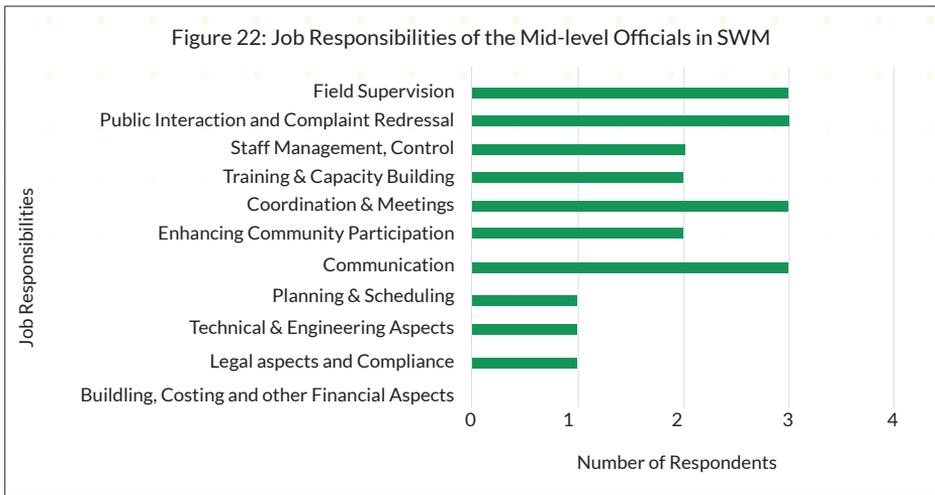
## Sector Specific Assessment

This section deals with the various aspects of SWM. The respondents were assessed on their knowledge and training needs with respect to the institutional, legislative framework, technical and engineering aspects of solid waste management. In addition, their knowledge on financial management, project management, community engagement and disaster management was also evaluated. Based on relevance to their job profile, training priorities were recorded. The findings under the five domains are listed below. The detailed methodology and findings and of analysis is attached as Annexure 5. .

### Institutional and Legislative Framework

Almost all respondents have a good understanding of the legislations in SWM. However, they require training on amendments.

### Technical and Engineering aspects of Solid Waste Management

While all the respondents have a fair level of understanding of the technical and engineering aspects of SWM, they showed a preference towards advanced training for the same.

### Financial Management

The Mid-level Officials do not deal with financial management of the projects. However, they felt there is need for basic training on this subject for their knowledge enhancement.

Table 9: Summary of Training Needs for Mid-level
functionaries in Solid Waste Management Sector at BMC

| Domains/ Aspects | Training Need |
|---|---|
| Institutional and Legislative framework | Yes, a brief session covering updated legislations and rules in SWM. |
| Technical and Engineering Aspects | Most have a fair understanding of the subject; Would require sessions on new technologies and concepts. |
| Financial Management | Yes, a basic level of financial management training is needed. |
| Community Engagement | Yes, especially on IEC models adopted by other cities. |
| Project Management and Private Partnerships | Yes, a brief session only covering operation and maintenance aspects. |

### *Community Engagement*

Community Engagement is an important part of their job role. They mentioned they would like to explore other tools used in Indian cities.

### *Project Management and Private Partnerships*

None of the respondents work on project planning. Officials mentioned that sessions on topics related to operation and maintenance would help in their day-to day activities. Most of them had a poor understanding of this subject. Topics concerning private partnership are not a priority for them.

The findings of TANA for the Mid-level Officials working in solid waste management sector is summarized in Table 9.

## 4.6.2.4. General Preferences for Training Programme

In order to understand the logistical preferences of the Mid-level Officials at BMC, respondent's preferences regarding the language of training delivery, mode of delivery, duration of the programme, and expectations were sought. The cumulative responses on these aspects for the three sectors is summarized below.

### Exposure through previous programmes of capacity building

The mid-level officials working at BMC have sporadic opportunities to attend capacity building programmes. In the past three years, about one-third respondents have not attended any programmes.

Figure 23: Number of capacity building programmes attended

- 56% Nil
- 44% Less than 3
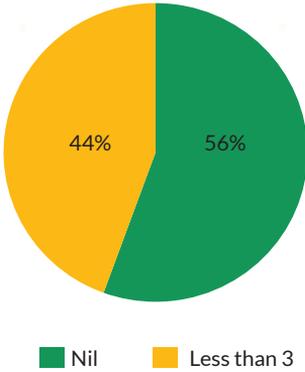


Figure 24: Preferred time frame of the Mid-level Officials

- 27% Jan-March
- 18% April-June
- 55% Oct-Dec
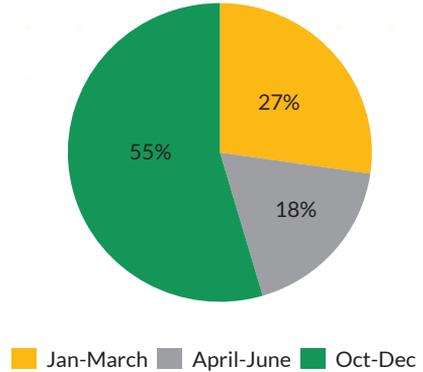
## Time of Training Programme

Most respondents prefer the training to be held in months of October to December. The second most preferable time was in the months of January to March. The April to June month is the least preferred time for the training delivery. Figure 24 shows the details of the share of the preferred time duration of the training delivery. This response is specially with regard to face-to-face training programmes.

## Medium of Instruction of Training Programmes

A large majority of the respondent preferred Hindi language as a medium for delivery of training programmes. Figure 25 shows the preference of language for the training delivery.



Figure 25: Preferred Medium of Instruction

- 60% Hindi
- 40% English

Figure 26: Preferred Duration of Training Programmes

12%
88%

■ 1 day   ■ 3 days



Figure 27: Preferred Location of Training Programme for Mid-level Officials

42%
50%
8%

■ Within city       ■ Other states
■ Outside city within state
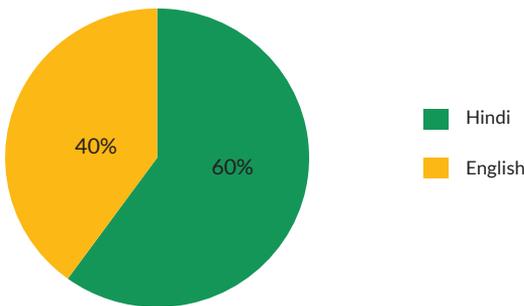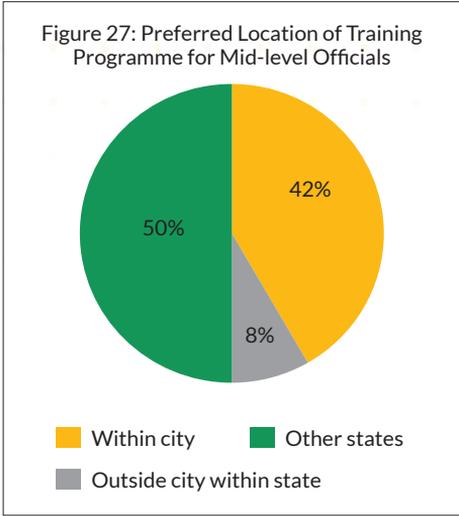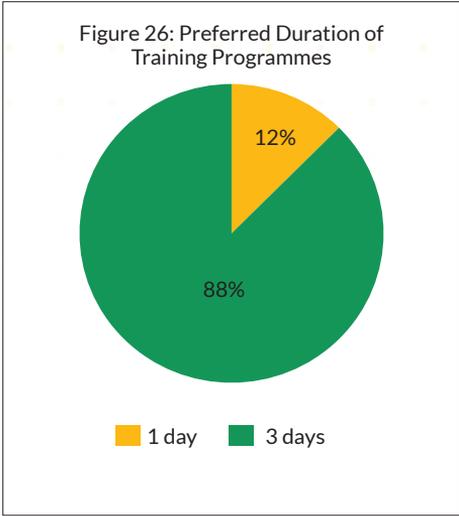
## Duration of Training Programme

Most of the respondents are in favour of 3-day long training programme. Few respondents suggested a 2-day long training programme. Figure 26 shows the share of respondents for their preferred duration of the training programme.

## Location of Training Programme

With respect to physical training and exposure visits, questions were asked to assess the preference of the Mid-level Officials at BMC. Half of respondents prefer a training programme in other state and 40% of the respondents prefer within the city. Only a few respondents suggested training programmes delivered outside city, but within the state. Figure 27 shows the share of respondents corresponding to their preference of the location of the training programme.

## Mode of Training Delivery

Most respondents suggested E-learning material and aids, Exposure Trips as the preferred mode of training delivery. They also suggested Face-to-Face and Interactive discussions as preferred modes of training. Respondents suggested that ready reference material and workshops would also be a good mode of training. Figure 28 shows the choices of the respondents with respect to the mode of training delivery.

**Figure 28: Preferred Mode of Training for Mid-level Officials at BMC**

Mode of Training

| Mode | Number of Respondents |
|------|----------------------|
| E-Learning material and aid | 4 |
| Reference material | 4 |
| Exposure trips | 7 |
| Interactive discussion | 3 |
| Workshop, Seminar | 7 |
| Classroom teaching | 2 |

Number of Respondents
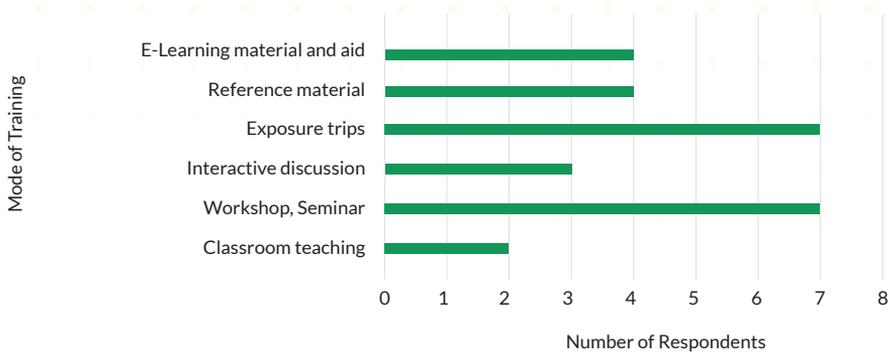
**Figure 29: Expected Outcomes of the Training Programmes reported by the Mid-level Officials at BMC**

Expectations from training programme

| Expectation | Number of Respondents |
|-------------|----------------------|
| Others | 0 |
| Improving Inter-agency coordination | 0 |
| Community Participation Tools | 2 |
| Improving Service Delivery | 8 |
| Skills enhancement | 9 |
| Knowledge enhancement | 5 |

Number of Respondents
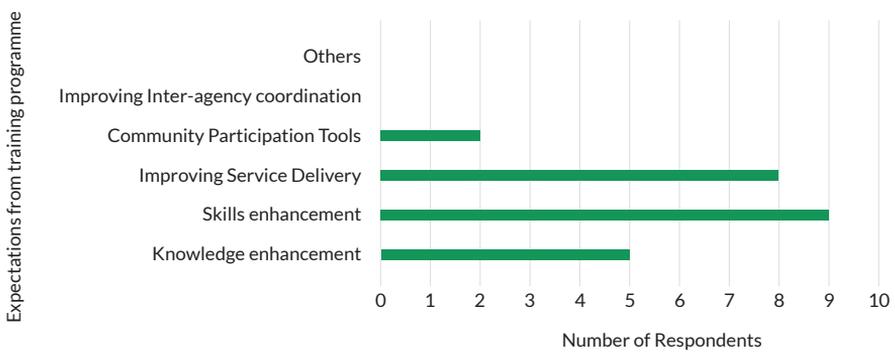
## Expectations from the training programmes

Improving service delivery, skill and knowledge of the sector is an important part of the job profile of the Mid-level Officials. This is common across the three sectors. The respondents expect sessions on skill and knowledge enhancement and community participation tools as important parts of the training programme. Figure 29 shows the preferred expected outcomes of the training programmes.

Table 10: Summary of general preferences of training programmes of
Mid-level Officials at BMC

| Parameter | Preference/Remarks |
|---|---|
| Exposure through Previous Programmes of Capacity Building | Not well exposed to regular capacity building programmes |
| Medium of Instruction | Hindi |
| Duration | 3 Days |
| Time | October, November, December, followed by January, February, March |
| Location | Outside State |
| Mode of Delivery | 1st preference - Face to face, 2nd preference- On-line / E Learning and Aids |
| Expected Outcomes | Improving Service Delivery, Community Participation Tools, Skill Enhancement, Knowledge Enhancement |

The general preferences of training programme as discussed above is summarized in Table 10.

### 4.6.3 Training Needs- Ground Level Functionaries

The ground level functionaries comprise the personnel working in the field performing the functioning and maintenance of ground works. These include functionaries working in the ULB and the personnel employed by the private parties. For understanding the training needs of the ground level functionaries, 2 focus group discussions and 12 personal interviews were conducted. These officials comprised sanitary workers, water supply workers, desludging operators, etc. The FGDs were done to assess the needs, issues and challenges faced in performing their day-to-day activities. The detailed findings have been mentioned sector wise in the following sub-sections.

#### 4.6.3.1 Water Supply

In BMC, Water Supply is headed by the Chief Engineer (CE) of the Water Works Department. To assess the needs of the ground level functionaries, online focused group discussions were conducted. The following was observed among the personnel on the ground level.

#### Priorities of the Ground functionaries

The ground and the field workers stated during the interview that they are well adept with the knowledge and support from the higher

officials in carrying out their job responsibilities. The only segment they lack-in is the skill enhancement through various technologies that could help them to work more efficiently.

## Training needs

It was observed and suggested by the functionaries that they would wish to learn and train themselves in various available technologies, technical and electrical training, and fixing motor, line jointing, gear valve operation and fitting.

## Mode and Medium of training

The preferred mode of training for the junior and ground staff as stated was physical training, as on- ground trainings are more convenient and easy to understand as well as implement. They also suggested that training delivery through various videos, guidebooks and ready reference would be more preferable and beneficial for learning. Lastly, they recommended that training should be delivered in Hindi language for better understanding.

### 4.6.3.2  Waste water

In BMC, the Executive Engineer of the PHE cell heads the Sewerage Cell. However, to assess the needs of the ground functionaries, online interview was conducted to understand their needs. The following was observed among the ground personnel.

## Training needs

It was suggested by the functionary that they wish to learn and train themselves in various small cleaning equipment, sucking machines and health and safety protocols.

## Mode and Medium of training

The preferred mode of training for the junior and ground staff as stated was physical training as on- ground trainings are more convenient and easy to learn. They also suggested that training delivery through various videos, guidebooks and ready reference would be more preferable and beneficial. Lastly, they recommended that training should be delivered in the Hindi language.

### 4.6.3.3 Solid Waste Management

In the area of Solid Waste Management, the Health and Environment Department is responsible for primary and secondary collection, segregation of municipal solid waste, cleaning of drainage channels and road sweeping. The Sanitary Inspectors oversee the implementation of sanitation and SWM activities through the Deputy Sanitary Inspectors (DSI's). Each DSI has 10-15 sanitary workers working with him, for implementing SWM and Sanitation in their respective areas. The following has been found with regard to the needs of the ground level workers.

All Sanitary workers of BMC believed that they are well acquainted with the knowledge and support from the higher officials in carrying out their job responsibilities. They also believed that the coordination and support they get from the community also helps them to perform their job better. The only segment they lack-in is the skill enhancement in community interaction and Home composting models that could help them to work more efficiently.

### Training Needs

The ground staff of SWM informed during the interview that they have been receiving training regularly from their subordinate officers to perform their duties well. However, the sanitary workers had a training requirement related to the IEC tools, home composting models and waste segregation.

### Mode and Medium of training

The preferred mode of training for the junior and ground staff as stated was physical training as they are more convenient and easy to understand. They also recommended that training should be delivered in the regional language for better understanding.

Table 11 provides an overview of the training needs for the ground level functionaries, assessed across various departments dealing with Water, Waste Water and Solid Waste Management sector, at BMC.

Table 11: Summary of Training Needs of Ground- level functionaries at BMC

| SECTOR | GAPS INDENTIFIED | TRAINING NEEDS | TRAINING MODE | TRAINING MEDIUM |
|---|---|---|---|---|
| Solid Waste Management | Technical management and Operation and maintenance | Training on various available technology for home composting and waste segregation, skills enhancement and community engagement | On-site | Hindi |
| Water Management | Technical and management skills | Training on available technology to enhance skills to perform day to day duties efficiently | On-site | Hindi |
| Waste Water | Technical and management skills | Training on available small vehicles for cleaning and sucking and health and Safety Protocols. | On-site | Hindi |

## 4.7  Conclusion

The TANA findings of the various stakeholders explained in the previous sections is summarized as below:

BMC is performing well in Swachh Survekshan (cleanliness survey) from last four consecutive years. Although it was felt that a training based on successful SWM models, operation and maintenance of services and community participation will add value to the existing system.

A large number of water bodies are present in the jurisdiction of BMC training on IUWM is recommended for officials.

BMC currently has FSSM covered under the AMRUT scheme, however, the officials seemed interested to gain some knowledge on the Co treatment technologies of FSSM.

Given the current COVID-19 situation, almost every stakeholder group has shown an interest in delivery of the trainings pertaining to disaster and risk preparedness.

A need was identified from both Mid-level Officials and ground level functionaries to provide case study based training for operation and maintenance of services and facilities in their respective sectors.

Majority of officials from three sectors preferred Hindi language for delivery of training programme.

Table 12: Summary of Training Needs for Mid-level Officials for Water Sector in BMC

| Parameter | Training Needed | Training Priorities* |
|---|---|---|
| **LEGISLATIVE AND INSTITUTIONAL FRAMEWORK** | | |
| Legislative Framework | Yes | 🟩 |
| Institutional Framework | No | 🟦 |
| Provisions and Elements of Water Management in Missions and Scheme | Yes | 🟩 |
| **WATER MANAGEMENT SYSTEMS** | | |
| Water Supply Systems | Yes | 🟩 |
| Reduction of Water Losses | Yes | 🟩 |
| Water Budgeting and Water Balance | Yes | 🟩 |
| SCADA (Supervisory Control and Data Acquisition) | Yes | 🟩 |
| IUWM | Yes | 🟩 |
| **FINANCIAL MANAGEMENT** | | |
| Sources to access funds (details of grants/loans at central, state, and local level) | Yes | 🟨 |
| Understanding types of Financial Transfers (Tariff Regulations or Local Revenue Sources, etc.) | Yes | 🟨 |
| Resource Mobilization | Yes | 🟨 |
| Various Business Models | Yes | 🟩 |
| Cost Recovery, Cost Efficiency and Financial Management | Yes | 🟩 |
| **COMMUNITY ENGAGEMENT** | | |
| Need for Community Engagement, Water Use Efficiency | No | 🟦 |
| Various Community Engagement Models and Structures | Yes | 🟩 |
| Information, Education and Communication (IEC) | Yes | 🟩 |
| **PROJECT MANAGEMENT AND PRIVATE SECTOR PARTNERSHIP** | | |
| Project Planning, Monitoring and Control | No | 🟦 |
| Various Models of PPP | No | 🟦 |
| Tendering and Procurement, Project Evaluation | Yes | 🟩 |

| Parameter | Training Needed | Training Priorities* |
|---|---|---|
| Public Interaction and Complaint Redressal System | No | <span style="background:yellow"> </span> |
| Use of ICT, GIS, RS and Technology in management of assets and resources | Yes | <span style="background:blue"> </span> |

*Green represents High Priority, Yellow represents Medium Priority, Blue represents Low priority*

Table 13: Summary of Training Needs for Mid-level Officials for Waste Water Sector in BMC

| Parameter | Training Needed | Training Priorities* |
|---|---|---|
| **LEGISLATIVE AND INSTITUTIONAL FRAMEWORK** | | |
| Legislative framework | Yes | Yellow |
| Institutional Framework | Yes | Yellow |
| Provisions and Elements of Water Management in Missions and Scheme | No | Blue |
| **WASTE WATER MANAGEMENT TECHNOLOGIES** | | |
| Need for waste water management | Yes | Green |
| Wastewater Generation | No | Blue |
| Waste Water Treatment | Yes | Green |
| Waste Water Disposal/Reuse | Yes | Green |
| Grievance Redressal System | No | Blue |
| **FAECAL SLUDGE AND SEPTAGE MANAGEMENT** | | |
| Faecal Sludge and Septage Management | Yes | Green |
| Occupational Hazards and Safety in handling Faecal Sludge | Yes | Green |
| Operation, Maintenance and Monitoring of Faecal Sludge Treatment Plants | Yes | Green |
| Grievance Redressal System | Yes | Green |
| **FINANCIAL MANAGEMENT** | | |
| Sources to access funds (details of grants or loans at central, state and local level, details of external funding agencies, institutions, borrowing capacity of ULBs etc. | No | Blue |
| Understanding types of Financial Transfers (Tariff Regulations or Local Revenue Sources, punitive measures, etc.) | No | Blue |
| Resource Mobilization | No | Blue |

| Parameter | Training Needed | Training Priorities* |
|---|---|---|
| Various Business Models | No | <span style="background:blue"> </span> |
| Cost Recovery, Cost Efficiency and Financial Management | Yes | <span style="background:yellow"> </span> |
| COMMUNITY ENGAGEMENT | | |
| Need for Community Engagement, Water Use Efficiency | No | <span style="background:yellow"> </span> |
| Various Community Engagement Models and Structures | No | <span style="background:yellow"> </span> |
| Information, Education and Communication (IEC) | No | <span style="background:yellow"> </span> |
| PROJECT MANAGEMENT AND PRIVATE SECTOR PARTNERSHIP | | |
| Project Planning, Monitoring and Control | Yes | <span style="background:green"> </span> |
| Various Models of PPP | Yes | <span style="background:green"> </span> |
| Public Interaction and Complaint Redressal System | Yes | <span style="background:green"> </span> |
| Use of ICT, GIS, RS and Technology in management of assets and resources | Yes | <span style="background:green"> </span> |

*Green represents High Priority, Yellow represents Medium Priority, Blue represents Low priority*

Table 14: Summary of Training Needs for
Mid-level Officials for Solid Waste Management  Sector in BMC

| Parameter | Training Needed | Training Priorities* |
|---|---|---|
| **LEGISLATIVE AND INSTITUTIONAL FRAMEWORK** | | |
| Legislative framework | Yes | <span style="background:green"> </span> |
| Institutional Framework | Yes | <span style="background:green"> </span> |
| Provisions for SWM in Missions And Schemes | Yes | <span style="background:green"> </span> |
| **SOLID WASTE VALUE CHAIN MANAGEMENT** | | |
| Waste Segregation and Collection | Yes | <span style="background:green"> </span> |
| Wet waste management Technology and approaches | Yes | <span style="background:green"> </span> |
| Dry waste management approaches and technology | Yes | <span style="background:green"> </span> |
| Selection of Solid waste management technologies | Yes | <span style="background:green"> </span> |
| Waste disposal – Sanitary landfill | Yes | <span style="background:green"> </span> |
| Occupational Health and Safety | Yes | <span style="background:green"> </span> |
| **FINANCIAL MANAGEMENT** | | |
| Sources to access funds (details of grants or loans at central, state and local level, details of external funding agencies, institutions, borrowing capacity of ULBs etc.) | Yes | <span style="background:green"> </span> |
| Various stakeholders from financing point of view | Yes | <span style="background:green"> </span> |

| Parameter | Training Needed | Training Priorities* |
|---|---|---|
| Understanding types of Financial Transfers (Tariff Regulations or Local Revenue Sources, etc.) | Yes | |
| Resource Mobilization | Yes | |
| Various Business Models | Yes | |
| Cost Recovery, Cost Efficiency and Financial Management | Yes | |
| **COMMUNITY ENGAGEMENT** | | |
| Need for Community Engagement | Yes | |
| Various Community Engagement Models and Structures | Yes | |
| Information, Education and Communication (IEC) | Yes | |
| **PROJECT MANAGEMENT AND PRIVATE SECTOR PARTNERSHIP** | | |
| Project Planning, Monitoring and Control | No | |
| Public Interaction and Complaint Redressal System | No | |
| Use of ICT for management | No | |

*Green represents High Priority, Yellow represents Medium Priority, Blue represents Low priority*

Based on the findings of the TANA conducted through interviews and assessments, a broad curriculum structure, customized for the Bhopal Municipal Corporation is presented in Chapter 5.

# 5

## FINDINGS AND RECOMMENDATIONS

# 5  Findings and Recommendations

One of the objectives of this study is to identify the gaps that exist in the knowledge and understanding, and determine the training needs of the ULB officials in the five pilot cities. This would guide the design of the customised curriculum modules that would be delivered to the officials of various cadres in the five cities. This chapter provides findings as a comparison of the ULBs in the four cities after interviewing the officials and analysing the results. This is followed by a curriculum outline, which forms the recommendations of this report, mentioning the topics for training delivery to the officials in the three sectors, customised for each city.

## 5.1  Findings of TANA

The findings of the TANA are summarised here in tables. Table 15 shows the priorities of the ULBs as reported by their respective Commissioners. The priorities are mapped as per the preferences out of the three sectors of solid waste management, wastewater management and water management. They are categorised as per sector, each dealing with one sector. For a comprehensive understanding, the tables mention the findings of each sector with respect to the stakeholder group. Table 16 show the needs of the Bhopal for the three sectors of solid waste management, waste water management and water management respectively.

Table 15: Priorities of the BMC as mentioned by the Commissioner

| City | First Priority | Second Priority | Third Priority |
|---|---|---|---|
| Bhopal | Solid Waste Management | Waste Water Management | Water Management |

Table 16: Summary of gap analysis for three sectors in BMC

| Sector | Decision Makers | Mid-level Officials | Ground Level Functionaries |
|---|---|---|---|
| Solid Waste Management | • Successful SWM models in India<br>• Planning for financially sustainable projects | • Legislative Framework around solid waste management<br>• New technologies and models in value chain management<br>• Community Engagement<br>• Disaster & Emergency Preparedness | • Public Interaction<br>• Operational Health and Safety<br>• Home composting methods<br>• Disaster & Emergency Preparedness |
| Waste Water Management | Introduction to FSSM value chain | • Introduction to FSSM value chain with focus on co-treatment technologies<br>• Legislative Framework<br>• Public Interaction<br>• Project planning and Monitoring | • New Innovative options and technologies<br>• Health and safety |
| Water Supply Management | • Efficient Resource Management (concepts of IUWM)<br>• Planning for financially sustainable projects | • Demand side management<br>• New technologies of water treatment and rainwater harvesting<br>• Public Interaction<br>• Project Evaluation and Project Monitoring | • O&M (New available Technologies and applied engineering)<br>• Public Interaction |

## 5.2  Recommendations

The training need findings provide the preliminary directions to design the training curriculum and the modules to be delivered. Formulating a training curriculum outline is one of the outcomes of this study. The outlines are based on the findings of TANA, including few new concepts and strategies like Disaster and Emergency Preparedness, IUWM, Demand Side management and FSSM, etc., that would be relevant in the coming decades to tackle climate change resonating with the aim of GEF. The following section provides the training outlines for the four cities each outlined for the sectors and stakeholders.

## 5.3 Curriculum

Based on the findings and recommendations, the curriculum outlines for Bhopal are prepared mentioning in brief the topics that would be covered in the training. Broadly, the topics are similar across the cities, however, the contents under each topic would be dealt with varying depths depending on the identified city needs and demands. The curriculum outline of each city are mentioned in following sub-sections. The curriculum outline mentioned below is a tentative programme. The detailed curriculum, however, might vary in terms of the session name and contents.

Table 17, Table 18, and Table 19 provide the curriculum outline for BMC for the sectors solid waste management, wastewater management and water management respectively.

Table 17: Curriculum Outline for Solid Waste Management for BMC

| Stakeholder Group | Session Name | Topic to be delivered / Session contents |
|---|---|---|
| Decision Maker | Overview of SWM | Importance of SWM for economic development and environmental protection - SWM value chain, Linkages with SDG's and with climate change, convergence with health and livelihood missions |
| | Legislations, Policies and Programmes | Overview of existing legal framework, MoHUA Advisories |
| | Innovation in SWM value chain | New Innovative Approaches and Technologies (Decentralized and Centralized; Case studies: Successful SWM Models, Innovations (waste to wealth products) |
| | Financial and Project Management | Strategies for financially sustainable projects; Resource Mobilization (tapping available funds and resources from various levels of governance and other sources); Case Studies( Successful Business models for Waste Management and Resource Recovery) |
| | Role of IEC and ICT in SWM | Case studies – e.g. Integrated control command centre, Online monitoring tools, Case based examples of community engagement |
| | Disaster Preparedness and Emergency Response | Management Strategies (Resource mobilization and Loss minimization); Case Studies (Emergency Response Strategies adopted across other cities) |

| | | |
|---|---|---|
| **Mid-level Officials** | Overview of SWM | Overview of SWM - SWM value chain and Waste hierarchy; Convergence of SWM with SDG's and other government missions; |
| | Legislations, Policies and Programmes on SWM | Overview of existing legal framework, State SWM policy, SWM bye laws, SWM components in other National missions, MoHUA advisories |
| | SWM Chain Part I – Generation, Collection and Transportation | Available ICT Platforms, Waste stream assessment, Waste Composition, Importance of waste Segregation, Waste collection and transfer methods |
| | SWM chain Part II - Technologies for Processing, Treatment and Disposal | Centralized and Decentralized treatment technologies (wet and dry waste) with case studies, Waste disposal methods, Innovations in SWM |
| | Financial Management in SWM (basic) | Strategies making financially sustainable projects and revenue models |
| | Role of IEC in SWM | Importance of IEC tools in behaviour change; Case based examples of community engagement models – Kudumbashree, Ambikapur and Nawanshahr |
| | Disaster Preparedness and Emergency Response | SOPs; Health and Safety protocols- Use of PPE Kits, etc.; Case Studies (Emergency Response Strategies adopted across other cities) |
| **Ground-level Functionaries** | Context Setting | Understanding the basics of SWM; SWM Value chain and Waste hierarchy |
| | Legislations, Policies and Programmes on SWM | Basic Overview of Government Missions and Schemes; SWM bye laws; MoHUA Advisories Welfare schemes; Health and education schemes |
| | New Innovative Approaches & Technologies | Decentralized Waste Management Approaches and Technologies; Successful SWM Models- Segregation, Collection and Processing, Home composting methods |
| | SWM Workers as Change Agent | Behavioural Change and Communication skills; IEC for Community Engagement, Case based examples of community engagement models – Kudumbashree, Ambikapur and Nawanshahr, etc. |
| | Disaster Preparedness and Emergency Response | SOPs; Health and Safety protocols- Use of PPE Kits, etc.; Case Studies (Emergency Response Strategies adopted across other cities) |

Table 18: Curriculum Outline for Waste Water Management for BMC

| Stakeholder Group | Session Name | Topic to be delivered / Session contents |
|---|---|---|
| **Decision Maker** | Overview | Overview of Wastewater Management and FSSM |
| | New Innovative Approaches & Technologies | New Innovative Approaches and Technologies (O&M, Treatment) |
| | Financial and Project Management | Strategies for financially sustainable projects; Case studies: Successful Business Models (Efficient Reuse of treated waste water and revenue generation) |
| **Mid-level Officials** | Overview & Context Setting | Overview of Wastewater Management and FSSM |
| | Legislations, Policies and Programmes on SWM | Brief Overview of existing Legislative Framework (National and state level policies and programs, Rules and Guidelines) |
| | New Innovative Approaches & Technologies | New Innovative and Cost Effective approaches and technologies (Treatment and Reuse etc.); O&M (New innovative approaches & Technologies) |
| | Project Management | Project planning and monitoring, PPP Models |
| | Disaster Preparedness and Emergency Response | SOPs; Case Studies (Emergency Response Strategies adopted across other cities) |
| **Ground-level Functionaries** | Overview & Context Setting | Understanding the basics of FSSM value chain |
| | New Innovative Approaches & Technologies | New available Technologies and applied engineering (O&M); |
| | Schemes and Programs | Beneficiary Schemes and Programs (Provisions and benefits in various schemes) |
| | Disaster Preparedness and Emergency Response | SOPs; Health and Safety protocols- Use of PPE Kits, etc.; Case Studies (Emergency Response Strategies adopted across other cities) |

Table 19: Curriculum Outline for Water Management for BMC

| Stakeholder Group | Session Name | Topic to be delivered / Session contents |
|---|---|---|
| **Decision Maker** | Urban Water Management Landscape for India | Overview of Water Management Policies and Programmes at National and State Level |
| | Contemporary approaches for Water Management | IUWM, Water Audit, Water Budgeting, WSUD |
| | Technological Intervention for water management | SCADA, DMAs, Smart Technologies |
| | Financial management | Strategies for financially sustainable projects |
| **Mid-level Officials** | Urban Water Management Landscape for India | Overview of Water Management Policies and Programmes at National and State Level |
| | Legislations, Policies and Programmes on SWM | Brief Overview of existing Legislative Framework (National and state level policies and programs, Rules and Guidelines) |
| | Contemporary approaches for Water Management | IUWM, Water Audit, Water Budgeting, WSUD |
| | Project and Financial Management | Complaint Redressal; Water Billing and Meter Monitoring etc. |
| | Disaster Preparedness and Emergency Response | SOPs; Case Studies (Emergency Response Strategies adopted across other cities) |
| **Ground-level Functionaries** | Overview & Context Setting | Understanding the basics and need of Water Management |
| | New Innovative Approaches & Technologies | New available Technologies and applied engineering (O&M); |
| | Schemes and Programs | Beneficiary Schemes and Programs (Provisions and benefits in various schemes) |
| | Disaster Preparedness and Emergency Response | SOPs; Case Studies (Emergency Response Strategies adopted across other cities) |

# 6

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# 7

## ANNEXURES

# Annexure I
# TANA Questionnaire for Senior Officials

## Project Title:
''Sustainable Cities Integrated Approach Pilot in India''

## COMPONENT 3:
Partnerships, Knowledge Management and Capacity Building

The United Nations Industrial Development Organization (UNIDO) is implementing the SC-IAP programme in India along with the Ministry of Housing and Urban Affairs, Government of India. The core objective is to build resilience in five cities – Jaipur, Bhopal, Mysuru, Vijayawada and Guntur – by integrating sustainability concepts into urban planning and management strategies.

NIUA has been engaged by the UNIDO to conduct a Training and Assistance Need Analysis (TANA) for the ULB officials and elected representatives. This assessment will be conducted across Water, Waste Water and Solid Waste Management (SWM) sector in the city. The results of TANA will constitute the basis for developing a detailed training curriculum on Water, Waste Water and SWM. The designed training modules will help in enhancing the knowledge and build capacities of ULB officials towards sustainable city management. The content of these training modules will also contribute towards achieving the objectives of national level initiatives such as Smart Cities Mission, AMRUT, PMAY, NULM, NUHM and Swachh Bharat Mission. Development of the comprehensive training modules will be followed by a training and technical assistance program.

Name of the city   ........................................................................................

Date             ........................................................................................

Department      ........................................................................................

Cell             ........................................................................................

# CONFIDENTIALITY STATEMENT

The information shared in this interview will be used only towards the analysis of the Training Need Assessment and shall not be shared for any other purpose. Only the researchers involved in this study will see your responses

# VOLUNTARY PARTICIPATION

Your participation in this study is voluntary. If you do not want to participate, please return the questionnaire to the researcher. You also do not have to answer any question that makes you uncomfortable.

Please Sign below for your consent for the proceedings and/or the audio/video documentation of the same.

Name of the Respondent ..............................................................................

Designation: ..............................................................................

Signature ..............................................................................

1. As per you, rank the priorities of the ULB at present out of the three sectors of Water, Waste Water and Solid Waste Management on a scale of 1 to 3, with 1 being of highest priority and 3 being of lowest priority.
2. In your ULB, what are the key issues pertaining to water, wastewater and solid waste management?
3. How is your relationship with the Elected Representatives and community in the wards in the ULB? How do you work together?
4. Please mention the challenges in Planning, Financing, Implementation, and Monitoring in these sectors.

| | Water Supply Management | Wastewater Management | Solid Waste Management |
|---|---|---|---|
| Planning | | | |
| Financing | | | |
| Implementation | | | |
| Monitoring | | | |

5. What are your suggestions for the aforementioned challenges in the sectors?
6. How do you consider this project can assist in developing the capacity of your ULB, based on your prior experience? (priorities/key areas for training)
7. As per you, who do you think are the key stakeholders?

# Annexure 2
# TANA Questionnaire for Department Heads

1. Provide list of Functional Representatives (designation –wise) for each of the departments under the specified Agencies: An example is given below:

| SECTOR: SOLID WASTE MANAGEMENT / WASTE WATER MANAGEMENT / WATER MANAGEMENT | | | | | |
|---|---|---|---|---|---|
| AGENCY NAME: | | | | | |
| SL. No. | Department | Designation | Job Responsibilities | Total Staff | |
| | | | | Permanent | Contractual |
| i. | PHED (An example) | Executive Engineer | • Project Planning and Execution<br>• DPR Preparation<br>• Tender Approval & Management | | |
| | | | | | |

2. List of projects operational in the city in your sector:

| SECTOR: SOLID WASTE MANAGEMENT / WASTE WATER MANAGEMENT / WATER MANAGEMENT | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Sl. No | Project Name | Govt./ Bilateral & Multilateral Loans/ Funding Grants/ Others (if any) | Partners | | | Current status of Project Implementation | | |
| | | | Funding | O&M | Technical | Planning | Under Construction | Functional/ Operational |
| | | | | | | | | |
| | | | | | | | | |

3.  Are there any NGOs or other private agencies working with the ULBs in your city? If Yes:

| Sl. No | Name of the NGO/Private Agency | Point of Contact | Type (Private/ NGO/ RWA/Others) | Sector(Solid Waste/ Waste Water/ Water Management) | Type of Work/ Project Name | Role |
|---|---|---|---|---|---|---|
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |

4.  How many the RWAs (active/non-active)? What is your mode and frequency of engagement with them?
5.  What are your key focus areas in your sector and why?
6.  Do you have any suggestions for improvement in those areas?
7.  Were there any capacity building trainings held for your staff earlier? Do you find them useful?
    a.  Do you have any suggestions to improve the same?
8.  How is the coordination of the Elected Representatives and community in these sectors?
    a.  (If not, do you have any recommendations for improving the same?)
9.  Are there any innovative or best practices in the city in your sector?

# Annexure 3
# TANA Questionnaire for Mid-Level Officials

## Water Supply Management

### A. GENERAL INFORMATION

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. | Name | | | | | |
| 2. | Gender | | | | | |
| 3 | Age Group (in yrs) | <30 | 31-40 | 41-50 | 51-60 | 60< |
| 4. | Contact number (mobile) | | | | | |
| 5. | Email | | | | | |
| 6. | Educational qualification (Please tick the highest educational degree) | Higher Secondary | Senior Secondary | Diploma | Bachelors | Masters | Others (Specify) |
| 7. | Field of Education | | | | | |
| 8. | Department | | Cell | | | |
| 9. | Designation | | | | | |
| 10. | Type of position | Permanent | | Contractual | | Others(Specify) |
| 11. | Number of Years of Experience in the current position | 1-5 years | 5- 10 years | 10-15 years | Above 15 years | |

| In your current position what are your responsibilities? (Tick as many relevant) | |
|---|---|
| | Planning & Scheduling | |
| | Legal aspects and Compliance | |
| | Technical & Engineering Aspects | |
| | Budgeting, Costing and other Financial Aspects | |
| | Communication | |
| 12. | Field Supervision | |
| | Coordination & Meetings | |
| | Staff Management, Control | |
| | Training & Capacity Building | |
| | Enhancing Community Participation | |
| | Public Interaction and Complaint Redressal | |
| | Any Other (Please Specify) | |

13. Have attended any training programmes/ workshops/conference in last three years regarding Water Supply and Management?
   a. Yes
   b. No

If Yes, Specify the following:

| Name of the training programme/ workshop/ conference | Topic/ Subject | Year | Duration | Organized by | Sponsored by | Level of relevance to current Job function/ duties | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | Highly Relevant | Some what Relevant | Not Relevant |
| | | | | | | | | |
| | | | | | | | | |

14. Please suggest your preferred medium for the training programmes?
   a. English
   b. Hindi
   c. Others(Specify)

15. What are your expectations from the training programmes?
    a.  Knowledge enhancement
    b.  Skills enhancement
    c.  Improving Service Delivery
    d.  Community Participation Tools
    e.  Improving Inter-agency coordination
    f.  Others (Specify)


16. Please suggest your preferred duration of training programmes
    a.  One day
    b.  Two days
    c.  Three days
    d.  Others(Specify)


17. Please suggest your preferred mode of training. You may tick more than one.
    a.  Classroom teaching
    b.  Workshop, Seminar
    c.  Interactive discussion
    d.  Exposure trips
    e.  Reference material
    f.  E-Learning material and aid
    g.  Others (Specify)


18. Please suggest your preferred location of training programme
    a.  Within city
    b.  Outside city, within state
    c.  Other states
    d.  Any Other (Specify)


19. Please suggest your preferred time frame for attending the training programme?
    a.  Jan-March
    b.  April-June
    c.  July-Sept
    d.  Oct-Dec
    e.  Other (Specify)

20. Of the following items, which do you identify important for training, to equip for future growth? You may choose more than 1
   a.  Water Quality, Source Augmentation, Water Reuse
   b.  Demand Side Management
   c.  Supply Side Systems and Management
   d.  Water Balance and Water Budgeting
   e.  Water Tariff and Pricing
   f.  Non-Revenue Water (NRW) and Unaccounted for Water (UFW) and its reduction
   g.  Rainwater Harvesting and Storm Water Management
   h.  Water Bodies Rejuvenation, Ground Water Management
   i.  Others

## B.   TRAINING NEEDS ASSESSMENT: WATER MANAGEMENT:

As per your level of knowledge and awareness rate yourself on the following parameters:

21. INSTITUTIONAL AND POLICY FRAMEWORK FOR WATER

| Sl. No. | Parameters | Relevance w.r.t. to Job role (Rate 0 to 5) | Level of Knowledge & Awareness | | | Training Needed | |
|---------|-----------|-----------|------|------|------|-----|----|
| | | | Good | Fair | Poor | Yes | No |
| 1. | **Legislative Framework** | | | | | | |
| 1.1 | National water policy, 2012 | | | | | | |
| 1.2 | Water (Prevention and Control of Pollution) Act, 1974 | | | | | | |
| 1.3 | Environment (Protection) Act, 1986 | | | | | | |
| 1.4 | State Water Policy | | | | | | |
| 1.5 | Municipal Corporation Act and other Municipal Acts | | | | | | |
| 2. | **Institutional Framework** | | | | | | |
| 2.1 | Roles and Responsibilities of Government Institutions (State/City/ULB) in water | | | | | | |
| 2.2 | Institutional Framework (State level/City Level/ULBs)- Jal Shakti Ministry | | | | | | |
| 3. | **Provisions and Elements of Water Management in Missions and Scheme** | | | | | | |
| 3.1 | Swachh Bharat Mission, 2014 | | | | | | |

| Sl. No. | Parameters | Relevance w.r.t. to Job role (Rate 0 to 5) | Level of Knowledge & Awareness | | | Training Needed | |
|---|---|---|---|---|---|---|---|
| | | | Good | Fair | Poor | Yes | No |
| 3.2 | Atal Mission for Rejuvenation and Urban Transformation (AMRUT), 2015 | | | | | | |
| 3.3 | Smart Cities Mission, 2015 | | | | | | |
| 3.4 | 14th & 15th Finance commission | | | | | | |
| 3.5 | Any State Schemes | | | | | | |
| 4. | Others if any (specify) | | | | | | |

## 22. WATER MANAGEMENT SYSTEMS

| Sl. No. | Parameters | Relevance w.r.t. to Job role (Rate 0 to 5) | Level of Knowledge & Understanding | | | Training Needed | |
|---|---|---|---|---|---|---|---|
| | | | Good | Fair | Poor | Yes | No |
| 1. | Water Supply Systems | | | | | | |
| 1.1 | Types of Water Supply Systems (characteristics, features, requirements, selection methods, etc.) | | | | | | |
| 1.2 | Available Treatment Technologies (technologies, selection criteria, treatment efficiency, land and infrastructure requirement, capex/Opex, etc.) | | | | | | |
| 1.3 | Water Supply Networks -Technical and Engineering aspects | | | | | | |
| 2. | Water Reuse Systems and Requirements | | | | | | |
| 3. | Factors Affecting the selection of water management system (Estimating water demand, supply, existing infrastructure, cost, design, etc.) | | | | | | |
| 4. | Reduction of Water Losses | | | | | | |
| 5. | Water Budgeting and Water Balance | | | | | | |
| 6. | SCADA (Supervisory Control and Data Acquisition) | | | | | | |
| 7. | Others, if any (Specify) | | | | | | |

23. Do you wish to explore private sector participation for Rain Water Harvesting?
   a.   Yes
   b.   No
   If Yes, Do you need any training for the same?
   c.   Yes
   d.   No

## 24. FINANCIAL MANAGEMENT

| Sl. No | Parameters | Relevance w.r.t. to Job role (Rate 0 to 5) | Level of Knowledge & Understanding | | | Training Needed | |
|---|---|---|---|---|---|---|---|
| | | | Good | Fair | Poor | Yes | No |
| 1. | Sources to access funds (details of grants/loans at central, state, and local level) | | | | | | |
| 2. | Understanding types of Financial Transfers (Tariff Regulations or Local Revenue Sources, etc.) | | | | | | |
| 3. | Resource Mobilization | | | | | | |
| 4. | Various Business Models | | | | | | |
| | Cost Recovery, Cost Efficiency & Financial Management | | | | | | |
| 5 | Others if any (Specify) | | | | | | |

## 25. COMMUNITY ENGAGEMENT

| Sl. No. | Parameters | Relevance w.r.t. to Job role (Rate 0 to 5) | Level of Knowledge & Understanding | | | Training Needed | |
|---|---|---|---|---|---|---|---|
| | | | Good | Fair | Poor | Yes | No |
| 1. | Need for Community Engagement, Water Use Efficiency | | | | | | |
| 2. | Various Community Engagement Models and Structures | | | | | | |
| 3. | Information, Education & Communication (IEC) | | | | | | |
| 4. | Others if any (Specify) | | | | | | |

## 26. PROJECT MANAGEMENT AND PRIVATE SECTOR PARTNERSHIP

| Sl. No. | Parameters | Relevance w.r.t. to Job role (Rate 0 to 5) | Level of Knowledge & Understanding | | | Training Needed | |
|---|---|---|---|---|---|---|---|
| | | | Good | Fair | Poor | Yes | No |
| 1. | Project Planning, Monitoring & Control | | | | | | |
| 1.1 | Preparation of Detailed Project Report (DPR) including physical and financial methods for cost estimate, budget, costing, legal compliances, EIA, etc. | | | | | | |
| 1.2 | Tendering and Procurement | | | | | | |
| 1.3 | Contract Management | | | | | | |
| 1.4 | Technical and Engineering Aspects | | | | | | |
| 1.5 | Administrative and Financial Management (Cost Recovery, Cost Efficiency) | | | | | | |
| 1.6 | Operation, Maintenance and Monitoring | | | | | | |
| 1.7 | Enforcement & Accountability | | | | | | |
| 1.8 | Project evaluation | | | | | | |
| 2. | Various Models of PPP | | | | | | |
| 3. | Public Interaction and Complaint Redressal System | | | | | | |
| 4. | Use of ICT, GIS, RS and Technology in management of assets and resources | | | | | | |
| 5. | Others if any (Specify) | | | | | | |

27. Do you think systems are well prepared for the disaster and emergencies?
28. Was the cities response well prepared for the COVID 19 crisis?
29. Were there proper operating procedures laid out for the management and functioning?
30. What would be your suggestions to improve?
31. Other Important Information / Remarks / Suggestions

# Wastewater Management

## A. GENERAL INFORMATION

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. | Name | | | | | |
| 2. | Gender | | | | | |
| 3. | Age (in yrs) | <30 | 31-40 | 41-45 | 51-60 | >60 |
| 4. | Contact number (mobile) | | | | | |
| 5. | Email | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 6. | Educational qualification (Please tick the highest educational degree) | Higher Secondary | Senior Secondary | Diploma | Bachelors | Masters | Others (Specify) |
| | | | | | | | |

| | | | | |
|---|---|---|---|---|
| 7. | Field of Education | | | |
| 8. | Department | | Cell | |
| 9. | Designation | | | |

| | | Permanent | Contractual | Others(Specify) |
|---|---|---|---|---|
| 10. | Type of position | | | |

| | | 1-5 years | 5- 10 years | 10-15 years | Above 15 years |
|---|---|---|---|---|---|
| 11. | Number of Years of Experience in the current position | | | | |

| | | |
|---|---|---|
| 12. | **In your current position what are your responsibilities?** | |
| | Planning & Scheduling | |
| | Legal aspects and Compliance | |
| | Technical & Engineering Aspects | |
| | Budgeting, Costing and other Financial Aspects | |
| | Communication | |
| | Field Supervision | |
| | Coordination & Meetings | |
| | Staff Management, Control | |
| | Training & Capacity Building | |
| | Enhancing Community Participation | |
| | Public Interaction and Complaint Redressal | |
| | Any Other (Please Specify) | |

13. Have attended any training programmes/ workshops/conference in last three years?
    a.   Yes
    b.   No
    If Yes, Specify the following:

| Name of the training programme/ workshop/ conference | Topic/ Subject | Year | Duration | Organized by | Sponsored by | Level of relevance to current Job function/duties | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | Highly Relevant | Some what Relevant | Not Relevant |
| | | | | | | | | |
| | | | | | | | | |

14. Please suggest your preferred medium for the training programmes?
    a.   English
    b.   Hindi
    c.   Others(Specify)

15. What are your expectations from the training programmes?
    a.   Knowledge enhancement
    b.   Skills enhancement
    c.   Improving Service Delivery
    d.   Community Participation Tools
    e.   Improvement Inter-agency coordination
    f.   Others (Specify)

16.  Please suggest your preferred duration of training programmes
   a.  One day
   b.  Two days
   c.  Three days
   d.  Others(Specify)

17. Please suggest your preferred mode of training. You may tick more than one.
   a.  Classroom teaching
   b.  Workshop, Seminar
   c.  Interactive discussion
   d.  Exposure trips
   e.  Reference material
   f.  E-Learning material and aid
   g.  Others (Specify)

18.  Please suggest your preferred location of training programme
   a.  Within city
   b.  Outside city, within state
   c.  Other states
   d.  Any Other (Specify)

19. Please suggest your preferred time frame for attending the training programme?
   a.  Jan-March
   b.  April-June
   c.  July-Sept
   d.  Oct-Dec
   e.  Other (Specify)

## B. TRAINING NEEDS ASSESSMENT: WASTE WATER MANAGEMENT:

As per your level of knowledge and awareness rate yourself on the following parameters:

### 20. INSTITUTIONAL AND GOVERNANCE FOR WASTEWATER AND SANITATION

| Sl. No. | Parameters | Relevance level w.r.t your job responsibility (0 to 5) | Level of Knowledge & Awareness | | | Training Needed | |
|---|---|---|---|---|---|---|---|
| | | | Good | Fair | Poor | Yes | No |
| 1. | **Legislative framework** | | | | | | |
| 1.1 | Environment (Protection) Act, 1986 | | | | | | |
| 1.2 | Water (Prevention and Control of Pollution) Act, 1974 | | | | | | |
| 1.3 | National Environmental Policy, 2006 | | | | | | |
| 1.4 | National Urban Sanitation Policy, 2008 | | | | | | |
| 1.5 | Prohibition of Employment as Manual Scavengers and Their Rehabilitation Act, 2013 | | | | | | |
| 1.6 | Framework for municipal functions (Municipal act, Service rules, Building bye-laws, Municipal Bye-laws, etc.) | | | | | | |
| 1.7 | CPCB/SPCB Guidelines | | | | | | |
| 1.8 | NGT Rules | | | | | | |
| 1.9 | State Urban Sanitation Policy and State Urban Sanitation Strategy | | | | | | |
| 2. | **Institutional Framework** | | | | | | |
| 2.1 | Organization structure, Roles and Responsibilities of Government departments | | | | | | |
| 2.2 | Roles and Responsibilities of other relevant stakeholders like SPCBs, NGOs, RWAs | | | | | | |
| 2.3 | Inter Institutional Coordination mechanism, reporting | | | | | | |
| 2.4 | National Rating Scheme for Sanitation (Swachh Survekshan)and Other protocols(ODF,ODF+,ODF++, Water+,etc.) | | | | | | |

| Sl. No. | Parameters | Relevance level w.r.t your job responsibility (0 to 5) | Level of Knowledge & Awareness | | | Training Needed | |
|---|---|---|---|---|---|---|---|
| | | | Good | Fair | Poor | Yes | No |
| 3. | **Provisions and Elements of Water Management in Missions and Scheme** | | | | | | |
| 3.1 | Swachh Bharat Mission, 2014 | | | | | | |
| 3.2 | Atal Mission for Rejuvenation and Urban Transformation (AMRUT), 2015 | | | | | | |
| 3.3 | Smart Cities Mission, 2015 | | | | | | |
| 3.4 | 14th and 15th Finance Commission | | | | | | |
| 3.5 | NULM and NUHM | | | | | | |
| 4. | **Others if any (specify)** | | | | | | |

## 21. WASTE WATER MANAGEMENT

| Sl. No. | Parameters | Relevance level w.r.t your job responsibility (0 to 5) | Level of Knowledge & Understanding | | | Training Needed | |
|---|---|---|---|---|---|---|---|
| | | | Good | Fair | Poor | Yes | No |
| 1. | **Waste Water Management** | | | | | | |
| 1.1 | Need for waste water management | | | | | | |
| 2. | **Wastewater Generation** | | | | | | |
| 2.1 | Sources of waste water generation | | | | | | |
| 2.2 | Available options for conveyance of waste water (types, features, limitations, selection criteria, etc.) | | | | | | |
| 2.3 | Technical and Engineering aspects of types of conveyance systems (Infrastructure, capacity, capex/ opex, O&M, etc.) | | | | | | |

| Sl. No. | Parameters | Relevance level w.r.t your job responsibility (0 to 5) | Level of Knowledge & Understanding | | | Training Needed | |
|---|---|---|---|---|---|---|---|
| | | | Good | Fair | Poor | Yes | No |
| 3. | **Waste Water Treatment** | | | | | | |
| 3.1 | Types (Off-site sanitation system, Decentralized Wastewater Treatment (DEWATS), On-site sanitation system, etc.) | | | | | | |
| 3.2 | Available Technologies (types, features, treatment efficiency, limitations, selection criteria, etc.) | | | | | | |
| 3.3 | Technical and Engineering aspects of available technologies (Infrastructure, capacity, capex/opex, O&M, etc.) | | | | | | |
| 4. | **Waste Water Disposal/Reuse** | | | | | | |
| 4.1 | Awareness on associated health risks due to improper disposal | | | | | | |
| 4.2 | Current practices of Waste water reuse | | | | | | |
| 5. | **Grievance Redressal System** | | | | | | |
| 6. | **Others( if any)** | | | | | | |

## 22. FAECAL SLUDGE & SEPTAGE MANAGEMENT (FSSM)

| Sl. No. | Parameters | Relevance level w.r.t your job responsibility (0 to 5) | Level of Knowledge & Understanding | | | Training Needed | |
|---|---|---|---|---|---|---|---|
| | | | Good | Fair | Poor | Yes | No |
| 1. | Faecal Sludge and Septage Management | | | | | | |
| 1.1 | Need for FSSM | | | | | | |
| 1.2 | Design and Construction Guidelines for various types of containment systems and desludging frequency | | | | | | |
| 1.3 | Available Technologies for desludging of Septic Tanks (available equipment, advantages and limitations, selection criteria, capacity, efficiency, capex/opex etc.) | | | | | | |
| 1.4 | Available options for transporting the faecal sludge and septage (Features, limitations, capacity, selection criteria, capex/opex, etc.) | | | | | | |
| 1.5 | Available Treatment Technologies (technologies, selection criteria, treatment efficiency, land and infrastructure requirement, capex/opex, etc.) | | | | | | |
| 1.6 | Available Options for Disposal/Reuse | | | | | | |
| 2. | Occupational Hazards and Safety in handling Faecal Sludge | | | | | | |
| 2.1 | Awareness on associated risks to health | | | | | | |
| 2.2 | Mitigating measures (PPE, Training on use of tools/equipment, Training on standard operating procedures, etc.) | | | | | | |

| Sl. No. | Parameters | Relevance level w.r.t your job responsibility (0 to 5) | Level of Knowledge & Understanding | | | Training Needed | |
|---|---|---|---|---|---|---|---|
| | | | Good | Fair | Poor | Yes | No |
| 3. | Operation, Maintenance & Monitoring of Faecal Sludge Treatment Plants | | | | | | |
| 3.1 | Operation | | | | | | |
| 3.2 | Asset Management | | | | | | |
| 3.3 | Administrative/ Financial Management | | | | | | |
| 3.4 | Monitoring and Record-keeping | | | | | | |
| 3.5 | Managing volumes & schedules of FS collection | | | | | | |
| 3.6 | Utilizing available local resources | | | | | | |
| 3.7 | Storage & sale of end products | | | | | | |
| 4. | Grievance Redressal System | | | | | | |
| 5. | Others, if any (Specify) | | | | | | |

23. Do you wish to explore private sector participation for FSSM?
    a.   Yes
    b.   No

    If Yes, Do you need any training for the same?
    c.   Yes
    d.   No

24. Specify the various value chain points across FSSM for which you wish to explore private sector participation?

## 25. FINANCIAL MANAGEMENT

| Sl. No. | Parameters | Relevance level w.r.t your job responsibility (0 to 5) | Level of Knowledge & Understanding | | | Training Needed | |
|---|---|---|---|---|---|---|---|
| | | | Good | Fair | Poor | Yes | No |
| 1. | Sources to access funds (details of grants or loans at central, state and local level, details of external funding agencies, institutions, borrowing capacity of ULBsetc. | | | | | | |
| 2. | Various stakeholders from financing point of view | | | | | | |
| 3. | Understanding types of Financial Transfers (Tariff Regulations or Local Revenue Sources, punitive measures, etc.) | | | | | | |
| 4. | Resource Mobilization | | | | | | |
| 5. | Various Business Models | | | | | | |
| 6. | Cost Recovery, Cost Efficiency & Financial Management | | | | | | |
| 7. | Others if any (Specify) | | | | | | |

## 26. COMMUNITY ENGAGEMENT

| SL. No. | Parameters | Relevance level w.r.t your job responsibility (0 to 5) | Level of Knowledge & Understanding | | | Training Needed | |
|---|---|---|---|---|---|---|---|
| | | | Good | Fair | Poor | Yes | No |
| 1. | Need for Community Engagement | | | | | | |
| 2 | Various Community Engagement Models and Structures | | | | | | |
| 3. | Information, Education & Communication (IEC) | | | | | | |
| 4. | Others if any (Specify) | | | | | | |

| SL. No. | Parameters | Relevance level w.r.t your job responsibility (0 to 5) | Level of Knowledge & Understanding | | | Training Needed | |
|---|---|---|---|---|---|---|---|
| | | | Good | Fair | Poor | Yes | No |
| 1. | **Project Planning, Monitoring & Control** | | | | | | |
| 1.1 | Preparation of Detailed Project Report (DPR) including physical and financial methods for cost estimate, budget, costing, legal compliances, EIA, etc. | | | | | | |
| 1.2 | Tendering and Procurement | | | | | | |
| 1.3 | Contract Management | | | | | | |
| 1.4 | Technical and Engineering Aspects | | | | | | |
| 1.5 | Administrative and Financial Management ( Cost Recovery, Cost Efficiency) | | | | | | |
| 1.6 | Operation, Maintenance and Monitoring | | | | | | |
| 1.7 | Enforcement & Accountability | | | | | | |
| 1.8 | Project evaluation | | | | | | |
| 1.9 | Human Resource Management | | | | | | |
| 2. | **Various Models of PPP** | | | | | | |
| 3. | **Public Interaction and Complaint Redressal System** | | | | | | |
| 4. | **Use of ICT, GIS, RS and Technology in management of assets and resources** | | | | | | |
| 5. | **Others if any (Specify)** | | | | | | |

27. Project Management and Private Sector Partnership

28. Do you think systems are well prepared for the disaster and emergencies?

29. Was the cities response well prepared for the COVID 19 crisis?

30. Were there proper operating procedures laid out for the management and functioning?

31. What would be your suggestions to improve?

32. Other Important Information / Remarks / Suggestions

# Solid Waste Management

## A. GENERAL INFORMATION

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. | Name | | | | | |
| 2. | Gender | | | | | |
| 3. | Age Group (in yrs) | <30 | 31-40 | 41-50 | 51-60 | >60 |
| 4. | Contact number (mobile) | | | | | |
| 5. | Email | | | | | |

| | | Higher Secondary | Senior Secondary | Diploma | Bachelors | Masters | Others (Specify) |
|---|---|---|---|---|---|---|---|
| 6. | Educational qualification (Please tick the highest educational degree) | | | | | | |

| | | | |
|---|---|---|---|
| 7. | Field of Education | | |
| 8. | Department | | Cell |
| 9. | Designation | | |

| | | Permanent | Contractual | Others(Specify) |
|---|---|---|---|---|
| 10. | Type of position | | | |

| | | 1-5 years | 5- 10 years | 10-15 years | Above 15 years |
|---|---|---|---|---|---|
| 11. | Number of years of Experience In The Current Position | | | | |

| | In your current position what are your responsibilities? (Tick as many relevant) | |
|---|---|---|
| **12.** | Planning & Scheduling | |
| | Legal aspects and Compliance | |
| | Technical & Engineering Aspects | |
| | Budgeting, Costing and other Financial Aspects | |
| | Communication | |
| | Field Supervision | |
| | Coordination & Meetings | |
| | Staff Management, Control | |
| | Training & Capacity Building | |
| | Enhancing Community Participation | |
| | Public Interaction and Complaint Redressal | |
| | Any Other (Please Specify) | |

13. Have attended any training programmes/workshops/conference in last three years regarding Solid Waste Management?
    a. Yes
    b. No

If Yes, Specify the following:

| Name of the training programme/ workshop/ conference | Topic/ Subject | Year | Duration | Organized by | Sponsored by | Level of relevance to current Job function/duties | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | Highly Relevant | Some what Relevant | Not Relevant |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

14. Please suggest your preferred medium for the training programmes?
    a. English
    b. Hindi
    c. Others (Specify)

15. What are your expectations from the training programmes?
    a. Knowledge enhancement
    b. Skills enhancement
    c. Improving Service Delivery
    d. Community participation tools
    e. Improving Inter-agency coordination
    f. Others (Specify)


16. Please suggest your preferred duration of training programmes
    a. One day
    b. Two days
    c. Three days
    d. Others(Specify)


17. Please suggest your preferred mode of training. You may tick more than one.
    a. Classroom teaching
    b. Workshop, Seminar
    c. Interactive discussion
    d. Exposure trips
    e. Reference material
    f. E-Learning material and aid
    g. Others (Specify)


18. Please suggest your preferred location of training programme
    a. Within city
    b. Outside city within state
    c. Other states
    d. Any Other (Specify)


19. Please suggest your preferred time frame for attending the training programme?
    a. Jan-March
    b. April-June
    c. July-Sept
    d. Oct-Dec
    e. Other (Specify)

As per your level of knowledge and awareness, rate yourself on the following parameters:

## 20. INSTITUTIONAL AND POLICY FRAMEWORK FOR SOLID WASTE MANAGEMENT

| Sl. No. | Parameters | Relevance w.r.t. to Job role (Rate 0 to 5) | Level of Knowledge & Awareness | | | Training Needed | |
|---|---|---|---|---|---|---|---|
| | | | Good | Fair | Poor | Yes | No |
| 1. | **Legislative Framework** | | | | | | |
| 1.1 | National Urban Sanitation Policy, 2008 | | | | | | |
| 1.2 | Solid Waste Management rules | | | | | | |
| 1.3 | Plastic Waste Mgmt rules | | | | | | |
| 1.4 | C & D Waste Mgmt rules | | | | | | |
| 1.5 | E- Waste Mgmt rules | | | | | | |
| 1.6 | Bio- medical waste Mgmt rules (relevant parts) | | | | | | |
| 1.7 | Prohibition of Employment as Manual Scavengers and Their Rehabilitation Act, 2013 | | | | | | |
| 1.8 | Emergency Response Sanitation unit | | | | | | |
| 1.9 | National Safai Karamcharis Finance & Development Corporation (NSKFDC) | | | | | | |
| 1.10 | National Rating Scheme for Sanitation (Swachh Survekshan, ODF++, Water Plus) | | | | | | |
| 1.11 | State level State SWM Policy and Strategy | | | | | | |
| 1.12 | SWM Bye-Laws | | | | | | |
| 2. | **Institutional Framework** | | | | | | |
| 2.1 | Roles and Responsibilities of Government Institutions (State/City/ULB) in solid waste management ex –MOEFCC, MoHUA, SPCB's, CPCB, CPHEOO, NGT etc. | | | | | | |
| 2.2 | Institutional Framework (State level/ City Level/ULBs) | | | | | | |
| 3. | **Missions and Schemes** | | | | | | |
| 3.1 | Swachh Bharat Mission, 2014 | | | | | | |
| 3.2 | Atal Mission for Rejuvenation and Urban Transformation (AMRUT), 2015 | | | | | | |
| 3.3 | Smart Cities Mission, 2015 | | | | | | |
| 3.4 | National Urban Livelihood Mission | | | | | | |
| 4. | **Others if any (specify)** | | | | | | |

## 21. SOLID WASTE VALUE CHAIN MANAGEMENT

| Sl. No. | Parameters | Relevance w.r.t. to Job role (Rate 0 to 5) | Level of Knowledge & Understanding | | | Training Needed | |
|---|---|---|---|---|---|---|---|
| | | | Good | Fair | Poor | Yes | No |
| 1. | **Waste Segregation and Collection** | | | | | | |
| 1.1 | Types of Waste streams (characteristics, features, etc.) | | | | | | |
| 1.2 | Transportation of waste -Technical and Engineering aspects, transfer stations | | | | | | |
| 1.3 | Available Technologies (technologies, selection criteria, treatment efficiency, land and infrastructure requirement, capex/Opex, etc.) | | | | | | |
| 1.4 | Mainstreaming of waste pickers in waste management (Human resource management) | | | | | | |
| 1.5 | Use of ICT in Collection and Transportation | | | | | | |
| 2. | **SWM technologies (technical and engineering aspects) (Composting, Windrow Composting, Aerated Static pile composting, In-vessel composting, Anaerobic composting, Vermi Composting, Biomethanation, Incineration and energy recovery, Pelletization/Refuse Derived fuel system, Pyrolysis and Gasification, Plasma Pyrolysis, Sanitary Landfill)** | | | | | | |
| 2.1 | Wet waste management Technology and approaches | | | | | | |
| A. | Composting techniques | | | | | | |
| (i) | Types (Advantages & Disadvantages, Treatment efficiency, land requirement, selection criteria, etc.), Technical and Engineering aspects and Capex, Opex and Revenue aspects | | | | | | |
| B. | Biomethanization | | | | | | |
| (i) | Types (Advantages & Disadvantages, Treatment efficiency, land requirement, selection criteria, etc.), Technical and Engineering aspects and Capex, Opex and Revenue aspects | | | | | | |
| 2.2 | Dry waste management approaches and technology | | | | | | |
| (i) | Material recovery facility | | | | | | |

| Sl. No. | Parameters | Relevance w.r.t. to Job role (Rate 0 to 5) | Level of Knowledge & Understanding | | | Training Needed | |
|---|---|---|---|---|---|---|---|
| | | | Good | Fair | Poor | Yes | No |
| (ii) | Types (Advantages & Disadvantages, Treatment efficiency, land requirement, selection criteria, etc.), Technical and Engineering aspects and Capex, Opex and Revenue aspects | | | | | | |
| (iii | Recycling/ Reuse/Recovery technologies | | | | | | |
| (iv) | Potential Buyers | | | | | | |
| 3. | Selection of Solid waste management technologies | | | | | | |
| 3.1 | (Estimating waste generation volume, existing infrastructure, cost, etc.) | | | | | | |
| 3.2 | Available SWM technologies (Types, features, treatment efficiency, selection criteria) | | | | | | |
| 3.3 | Technical and engineering aspects of available technologies | | | | | | |
| 4. | Bulk waste generators (BWG) management | | | | | | |
| 4.2 | Bulk Waste Generator Identification/ Verification Process, compliance process, Types of BGG (Institutions, hotels, RWA's), Available technologies for BWG, | | | | | | |
| 5. | Waste disposal – Sanitary landfill | | | | | | |
| 5.1 | Planning, Designing and Construction of Secured landfill (Site selection, CAPEX, OPEX ) | | | | | | |
| 5.2 | Methods of Land Closure and Capping | | | | | | |
| 5.3 | Planning and Designing Leachate Treatment Facility | | | | | | |
| 6. | Occupational Health and Safety | | | | | | |
| 7. | Circular Economy models in Waste management (Closing the loop concept) | | | | | | |

22. Do you wish to explore private sector participation for SWM?
    a.  Yes
    b.  No

If Yes, Do you need any training for the same?
    a.  Yes
    b.  No

23. Specify the various value chain points across SWM for which you wish to explore for private sector participation?

## 24. FINANCIAL MANAGEMENT

| Sl. No. | Parameters | Relevance level w.r.t your job responsibility (0 to 5) | Level of Knowledge & Understanding | | | Training Needed | |
|---|---|---|---|---|---|---|---|
| | | | Good | Fair | Poor | Yes | No |
| 1. | Sources to access funds (details of grants or loans at central, state and local level, details of external funding agencies, institutions, borrowing capacity of ULBs etc. | | | | | | |
| 2. | Various stakeholders from financing point of view | | | | | | |
| 3. | Understanding types of Financial Transfers (Tariff Regulations or Local Revenue Sources, etc.) | | | | | | |
| 4. | Resource Mobilization | | | | | | |
| 5. | Various Business Models | | | | | | |
| 6. | Cost Recovery, Cost Efficiency & Financial Management | | | | | | |
| 7. | Others if any (Specify) | | | | | | |

## 25. COMMUNITY ENGAGEMENT

| SL. No. | Parameters | Relevance level w.r.t your job responsibility (0 to 5) | Level of Knowledge & Understanding | | | Training Needed | |
|---|---|---|---|---|---|---|---|
| | | | Good | Fair | Poor | Yes | No |
| 1. | Need for Community Engagement | | | | | | |
| 2. | Various Community Engagement Models and Structures | | | | | | |
| 3. | Information, Education & Communication (IEC) | | | | | | |
| 4. | Others if any (Specify) | | | | | | |

## 26. PROJECT MANAGEMENT AND PRIVATE SECTOR PARTNERSHIP

| SL. No. | Parameters | Relevance level w.r.t your job responsibility (0 to 5) | Level of Knowledge & Understanding | | | Training Needed | |
|---|---|---|---|---|---|---|---|
| | | | Good | Fair | Poor | Yes | No |
| 1. | **Project Planning, Monitoring & Control** | | | | | | |
| 1.1 | Preparation of Detailed Project Report (DPR) including physical and financial methods for cost estimate, budget, costing, legal compliances, EIA, etc. | | | | | | |
| 1.2 | Tendering and Procurement | | | | | | |
| 1.3 | Contract Management | | | | | | |
| 1.4 | Procuring, Installation & commissioning/ setting up SWM projects | | | | | | |
| 1.5 | Technical and Engineering Aspects | | | | | | |
| 1.6 | Administrative and Financial Management ( Cost Recovery, Cost Efficiency) | | | | | | |
| 1.7 | Operation, Maintenance and Monitoring | | | | | | |
| 1.8 | Enforcement & Accountability | | | | | | |
| 1.9 | Project evaluation | | | | | | |
| 1.10 | Human Resource Management | | | | | | |
| 2. | **Various Models of PPP** | | | | | | |
| 3. | **Public Interaction and Complaint Redressal System** | | | | | | |
| 4. | **Use of ICT for management** | | | | | | |
| 5. | **Others if any (Specify)** | | | | | | |

27. Do you think systems are well prepared for the disaster and emergencies?

28. Was the cities response well prepared for the COVID 19 crisis?

29. Were there proper operating procedures laid out for the management and functioning?

30. What would be your suggestions to improve?

31. Other Important Information / Remarks / Suggestions

# Annexure 4
# TANA Questionnaire for Ground staff

1. What are your future aspirations with the job?
2. What do you think is the status of the ULB in terms of sanitation and water supply?
3. How is your interaction with the community and residents? How frequently do you interact? What is your mode of communication?
4. What support do you currently get from the community and what are your expectations from them?
5. What support do you need from government officials and other superiors to perform your responsibilities better and efficiently?
6. What support do you need from your subordinates to perform your responsibilities?
7. What support do you need from other departments to perform your responsibilities?
8. What are your strengths while performing your job?
9. What are the difficulties you face in doing your job?
10. Have you received any kind of training before? (What kind and when) Were they useful?
11. What are the areas in which you would like to be trained for?
12. What kind of training would you prefer - face-to-face or virtual? Do you think exposure visits to good practice sites is useful? Why and how?
13. What is the right duration for training (face-to-face) and virtual?

# Annexure 5
# Detail findings of TANA for Bhopal Municipal Corporation

The detail findings of the TANA for the Mid-level Officials are tabulated in this annexure. It has been prepared for the three sectors of Water, Waste Water, and Solid Waste Management separately. The frequency of responses have been mapped cumulatively. The numbers under the relevance column are the total number of people who responded in numbers between 0-2 and 3-5 for that respective parameter, with 0 being completely irrelevant and 5 being highly relevant to their job role. The numbers mentioned under 'Level of Understanding' column are the number of people who responded that they have a 'Good', 'Fair' or 'Poor' understanding of the corresponding parameter. The total number of respondents saying that they would require a training for that particular parameter. The higher of the two numbers listed under relevance becomes results in the total; the parameter is taken as relevant if there is a higher number of responses under '3-5' column, else it is listed as not relevant. A similar logic has been followed to find the general level of understanding of the respective parameters. The column with the highest of the numbers under 'Good', 'Fair' and 'Poor' renders the 'Level of Understanding' under the 'Total'. A training priority is estimated from the higher of the columns under 'Training needed' column.

Table 20: Detail Training Needs of Water Management Sector

| Sl. No. | Parameter | Relevance | | Level of understanding | | | Trainings Needed | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 0 to 2 | 3 to 5 | Good | Fair | Poor | Yes | No | Relevance | Level of Understanding | Training Required |
| 1. | LEGISLATIVE AND INSTITUTIONAL FRAMEWORK | | | | | | | | | | |
| 1.1 | Legislative Framework | | | | | | | | | | |
| 1.1.1 | National water policy, 2012 | 2 | 1 | 0 | 3 | 0 | 2 | 1 | No | Fair | Yes |
| 1.1.2 | Water (Prevention and Control of Pollution) Act, 1974 | 2 | 1 | | 3 | | 2 | 1 | No | Fair | Yes |
| 1.1.3 | Environment (Protection) Act, 1986 | 2 | 1 | | 3 | | 2 | 1 | No | Fair | Yes |
| 1.1.4 | State Water Policy | | 3 | | 2 | 1 | 2 | 1 | Yes | Fair | Yes |
| 1.1.5 | Municipal Corporation Act and other Municipal Acts | | 3 | | 2 | | 2 | 1 | Yes | Fair | Yes |
| 1.2 | Institutional Framework | | | | | | | | | | |
| 1.2.1 | Roles and Responsibilities of Government Institutions (State/City/ULB) in water | 2 | | | 3 | | | 3 | No | Fair | No |
| 1.2.2 | Institutional Framework (State level/City Level/ULBs)- Jal Shakti Ministry | 2 | | | 1 | 2 | | 3 | No | Poor | No |
| 1.3 | Provisions and Elements of Water Management in Missions and Scheme | | | | | | | | | | |
| 1.3.1 | Swachh Bharat Mission, 2014 | | 3 | | 3 | | 2 | 1 | Yes | Fair | Yes |
| 1.3.2 | Atal Mission for Rejuvenation and Urban Transformation (AMRUT), 2015 | 1 | 2 | | 3 | | 2 | 1 | Yes | Fair | Yes |
| 1.3.3 | Smart Cities Mission, 2015 | 2 | 1 | | 3 | | 2 | 1 | No | Fair | Yes |
| 1.3.4 | 14th and 15th Finance commission | 2 | 1 | | 3 | | 2 | 1 | No | Fair | Yes |

| Sl. No. | Parameter | Relevance | | Level of understanding | | | Trainings Needed | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 0 to 2 | 3 to 5 | Good | Fair | Poor | Yes | No | Relevance | Level of Understanding | Training Required |
| 2. | WATER MANAGEMENT SYSTEMS | | | | | | | | | | |
| 2.1 | Water Supply Systems | | | | | | | | | | |
| 2.1.1 | Types of Water Supply Systems (characteristics, features, requirements, selection methods, etc.) | 1 | 2 | | 3 | | 2 | 1 | Yes | Fair | Yes |
| 2.1.2 | Available Treatment Technologies (technologies, selection criteria, treatment efficiency, land and infrastructure requirement, capex/Opex, etc.) | 2 | 1 | | 3 | | 3 | 1 | No | Fair | Yes |
| 2.1.3 | Water Supply Networks -Technical and Engineering aspects | 1 | 2 | | 3 | | 2 | 1 | Yes | Fair | Yes |
| 2.2 | Water Reuse Systems and Requirements | 3 | | | 1 | 2 | 2 | 1 | No | Poor | Yes |
| 2.3 | Factors Affecting the selection of water management system | 1 | 2 | | 3 | | 2 | 1 | Yes | Fair | Yes |
| 2.4 | Reduction of Water Losses | | 3 | | 3 | | 2 | 1 | Yes | Fair | Yes |
| 2.5 | Water Budgeting and Water Balance | 2 | 1 | | 3 | | 3 | | No | Fair | Yes |
| 2.6 | SCADA (Supervisory Control and Data Acquisition) | 2 | 1 | | 1 | 2 | 3 | | No | Poor | Yes |
| 2.7 | IUWM | 2 | 1 | | 1 | 2 | 2 | 1 | No | Poor | Yes |

| Sl. No. | Parameter | Relevance | | Level of understanding | | | Trainings Needed | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 0 to 2 | 3 to 5 | Good | Fair | Poor | Yes | No | Relevance | Level of Understanding | Training Required |
| 3. | FINANCIAL MANAGEMENT | | | | | | | | | | |
| 3.1 | Sources to access funds (details of grants/loans at central, state, and local level) | 3 | | | | 2 | 2 | 1 | No | Poor | Yes |
| 3.2 | Understanding types of Financial Transfers (Tariff Regulations or Local Revenue Sources, etc.) | 3 | | | | 2 | 2 | 1 | No | Poor | Yes |
| 3.3 | Resource Mobilization | 3 | | | | 2 | 2 | 1 | No | Poor | Yes |
| 3.4 | Various Business Models | 3 | | | | 2 | 2 | 1 | No | Poor | Yes |
| 3.5 | Cost Recovery, Cost Efficiency and Financial Management | 3 | | | 1 | 1 | 3 | | No | Poor | Yes |
| 4. | COMMUNITY ENGAGEMENT | | | | | | | | | | |
| 4.1 | Need for Community Engagement, Water Use Efficiency | | 3 | | 3 | | 1 | 2 | Yes | Fair | No |
| 4.2 | Various Community Engagement Models and Structures | 3 | | | 1 | 2 | 3 | | No | Poor | Yes |
| 4.3 | Information, Education and Communication (IEC) | 3 | | | 1 | 2 | 3 | | No | Poor | Yes |

| Sl. No. | Parameter | Relevance | | Level of understanding | | | Trainings Needed | | Relevance | Total | |
| | | 0 to 2 | 3 to 5 | Good | Fair | Poor | Yes | No | | Level of Understanding | Training Required |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 5. | PROJECT MANAGEMENT AND PRIVATE PARTNERSHIP | | | | | | | | | | |
| 5.1 | Project Planning, Monitoring and Control | | | | | | | | | | |
| 5.1.1 | Preparation of Detailed Project Report (DPR) including physical and financial methods for cost estimate, budget, costing, legal compliances, EIA, etc. | | 3 | | 3 | | | 3 | Yes | Fair | No |
| 5.1.2 | Tendering and Procurement | | 3 | | 3 | | 2 | 1 | Yes | Fair | Yes |
| 5.1.3 | Contract Management | 2 | 1 | | 3 | | 1 | 2 | No | Fair | No |
| 5.1.4 | Administrative and Financial Management (Cost Recovery, Cost Efficiency) | | | | | | | | No | Poor | No |
| 5.1.5 | Operation, Maintenance and Monitoring | | 3 | | 3 | | | 3 | Yes | Fair | No |
| 5.1.6 | Enforcement and Accountability | 2 | 1 | | 3 | | | 3 | No | Fair | No |
| 5.1.7 | Project evaluation | 3 | | | 3 | | 1 | 2 | No | Fair | No |
| 5.2 | Various Models of PPP | 3 | | | 2 | 1 | 3 | | No | Fair | Yes |
| 5.3 | Public Interaction and Complaint Redressal System | | 3 | | 3 | | 1 | 2 | Yes | Fair | No |
| 5.4 | Use of ICT, GIS, RS and Technology in management of assets and resources | 3 | | | 1 | 2 | 2 | 1 | No | Poor | Yes |

Table 21: Detail Training Needs of Waste Water Sector

| Sl. No. | Parameter | Relevance | | Level of understanding | | | Trainings Needed | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 0 to 2 | 3 to 5 | Good | Fair | Poor | Yes | No | Relevance | Level of Understanding | Training Required |
| 1. | LEGISLATIVE AND INSTITUTIONAL FRAMEWORK | | | | | | | | | | |
| 1.1 | Legislative Framework | | | | | | | | | | |
| 1.1.1 | Environment (Protection) Act, 1986 | | 3 | 1 | | 1 | 1 | 1 | Yes | Poor | No |
| 1.1.2 | Water (Prevention and Control of Pollution) Act, 1974 | 1 | 2 | 1 | | 1 | 1 | 1 | Yes | Poor | No |
| 1.1.3 | National Environmental Policy, 2006 | 3 | | | | 2 | 1 | 2 | No | Poor | No |
| 1.1.4 | National Urban Sanitation Policy, 2008 | 2 | 1 | | 1 | 1 | 2 | 1 | No | Poor | Yes |
| 1.1.5 | Prohibition of Employment as Manual Scavengers and Their Rehabilitation Act, 2013 | 1 | 2 | | 2 | | 2 | 1 | Yes | Fair | Yes |
| 1.1.6 | Framework for municipal functions (Municipal act, Service rules, Building bye laws, Municipal Bye laws, etc.) | | 3 | | 3 | | 3 | | Yes | Fair | Yes |
| 1.1.7 | CPCB/SPCB Guidelines | 1 | 2 | | 2 | 1 | 1 | 2 | Yes | Fair | No |
| 1.1.8 | NGT Rules | | 3 | | 2 | 1 | 2 | 1 | Yes | Fair | Yes |
| 1.1.9 | State Urban Sanitation Policy and State Urban Sanitation Strategy | 1 | 2 | | 1 | 2 | 2 | 1 | Yes | Poor | Yes |
| 1.2 | Institutional Framework | | | | | | | | | | |
| 1.2.1 | Organization structure, Roles and Responsibilities of Government departments | 2 | 1 | | 2 | 1 | 2 | 1 | No | Fair | Yes |
| 1.2.2 | Roles and Responsibilities of other relevant stakeholders like SPCBs, NGOs, RWAs | 2 | 1 | | 2 | 1 | 1 | 2 | No | Fair | No |
| 1.2.3 | Inter Institutional Coordination mechanism, reporting | 2 | 1 | | 2 | 1 | 2 | 1 | No | Fair | Yes |
| 1.2.4 | National Rating Scheme for Sanitation (Swachh Survekshan) and Other protocols (ODF,ODF+,ODF++, Water, etc.) | | 3 | 2 | 1 | | 1 | 2 | Yes | Good | No |

| Sl. No. | Parameter | Relevance | | Level of understanding | | | Trainings Needed | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 0 to 2 | 3 to 5 | Good | Fair | Poor | Yes | No | Relevance | Level of Understanding | Training Required |
| 1.3 | Provisions and Elements of Water Management in Missions and Scheme | | | | | | | | | | |
| 1.3.1 | Swachh Bharat Mission, 2014 | | 3 | 2 | 1 | | 2 | 1 | Yes | Good | Yes |
| 1.3.2 | Atal Mission for Rejuvenation and Urban Transformation (AMRUT), 2015 | | 3 | 1 | 2 | | 2 | 1 | Yes | Fair | Yes |
| 1.3.3 | Smart Cities Mission, 2015 | 2 | 1 | | 1 | 2 | 1 | 2 | No | Poor | No |
| 1.3.4 | 14th and 15th Finance Commission | 2 | 1 | | | 3 | | 3 | No | Poor | No |
| 1.3.5 | NULM and NUHM | 2 | 1 | | 1 | 2 | 1 | 2 | No | Poor | No |
| 2. | WASTE WATER MANAGEMENT TECHNOLOGIES | | | | | | | | | | |
| 2.1 | Need For Waste Water Management | | 3 | | 2 | | 2 | | Yes | Fair | Yes |
| 2.2 | Wastewater Generation | | | | | | | | | | |
| 2.2.1 | Sources of waste water generation | | 3 | 1 | 1 | | 1 | 1 | Yes | Poor | No |
| 2.2.2 | Available options for conveyance of waste water (types, features, limitations, selection criteria, etc.) | 2 | 1 | 1 | | 1 | | 2 | No | Poor | No |
| 2.2.3 | Technical and Engineering aspects of types of conveyance systems (Infrastructure, capacity, capex/opex, OandM, etc.) | 1 | 2 | 1 | 1 | | 1 | 1 | Yes | Poor | No |
| 2.3 | Waste Water Treatment | | | | | | | | | | |
| 2.3.1 | Types (Off-site sanitation system, Decentralized Wastewater Treatment (DEWATS),On-site sanitation system, etc.) | | 3 | | 3 | | 2 | 1 | Yes | Fair | Yes |
| 2.3.2 | Available Technologies (types, features, treatment efficiency, limitations, selection criteria, etc.) | 1 | 2 | | 3 | | 2 | 1 | Yes | Fair | Yes |
| 2.3.3 | Technical and Engineering aspects of available technologies (Infrastructure, capacity, capex/opex, OandM, etc.) | 1 | 2 | | 3 | | 2 | 1 | Yes | Fair | Yes |

| Sl. No. | Parameter | Relevance | | Level of understanding | | | Trainings Needed | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 0 to 2 | 3 to 5 | Good | Fair | Poor | Yes | No | Relevance | Level of Understanding | Training Required |
| 2.4 | Waste Water Disposal/Reuse | | | | | | | | | | |
| 2.4.1 | Awareness on associated health risks due to improper disposal | | 3 | | 2 | | 2 | 1 | Yes | Fair | Yes |
| 2.4.2 | Current practices of Waste water reuse | | 3 | | 2 | 1 | 2 | 1 | Yes | Fair | Yes |
| 2.5 | Grievance Redressal System | | 3 | | 1 | 2 | | 3 | Yes | Poor | No |
| 3. | FAECAL SLUDGE AND SEPTAGE MANAGEMENT | | | | | | | | | | |
| 3.1 | Faecal Sludge and Septage Management | | | | | | | | | | |
| 3.1.1 | Need for FSSM | | 3 | | 3 | | 3 | | Yes | Fair | Yes |
| 3.1.2 | Design and Construction Guidelines for various types of containment systems and desludging frequency | | 3 | | 3 | | 3 | | Yes | Fair | Yes |
| 3.1.3 | Available Technologies for desludging of Septic Tanks (available equipment's, advantages and limitations, selection criteria, capacity, efficiency, capex/opex etc.) | | 3 | | 3 | | 3 | | Yes | Fair | Yes |
| 3.1.4 | Available options for transporting the faecal sludge and septage (Features, limitations, capacity, selection criteria, capex/opex, etc.) | 1 | 2 | | 3 | | 3 | 1 | Yes | Fair | Yes |
| 3.1.5 | Available Treatment Technologies (technologies, selection criteria, treatment efficiency, land and infrastructure requirement, capex/opex, etc.) | | 3 | | 3 | | 3 | | Yes | Fair | Yes |
| 3.1.6 | Available Options for Disposal/Reuse | | 3 | | 3 | | 3 | | Yes | Fair | Yes |

| Sl. No. | Parameter | Relevance | | Level of understanding | | | Trainings Needed | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 0 to 2 | 3 to 5 | Good | Fair | Poor | Yes | No | Relevance | Level of Understanding | Training Required |
| 3.2 | Occupational Hazards and Safety in handling Faecal Sludge | | | | | | | | | | |
| 3.2.1 | Awareness on associated risks to health | | 3 | | 2 | | 2 | 1 | Yes | Fair | Yes |
| 3.2.2 | Mitigating measures | 1 | 2 | | 2 | | 2 | 1 | Yes | Fair | Yes |
| 3.2.3 | PPE, Training on use of tools/equipment's, Training on standard operating procedures, etc. | | 3 | | 2 | | 3 | | Yes | Fair | Yes |
| 3.3 | Operation, Maintenance and Monitoring of Faecal Sludge Treatment Plants | | | | | | | | | | |
| 3.3.1 | Operation procedures (Technical and Engineering) | 1 | 2 | | 2 | 1 | 3 | | Yes | Fair | Yes |
| 3.3.2 | (Technical and Engineering) | 1 | 2 | | 2 | 1 | 3 | | Yes | Fair | Yes |
| 3.3.3 | Asset Management | 1 | 2 | | 2 | 1 | 3 | | Yes | Fair | Yes |
| 3.3.4 | Administrative/Financial Management | 1 | 2 | | 2 | 1 | 3 | | Yes | Fair | Yes |
| 3.3.5 | Monitoring and Record-keeping | 1 | 2 | | 2 | 1 | 3 | | Yes | Fair | Yes |
| 3.3.6 | Managing volumes and schedules of FS collection | 1 | 2 | | 2 | 1 | 3 | | Yes | Fair | Yes |
| 3.3.7 | Utilizing available local resources | 1 | 2 | | 2 | 1 | 3 | | Yes | Fair | Yes |
| 3.3.8 | Storage and sale of end products | 1 | 2 | | 2 | 1 | 3 | | Yes | Fair | Yes |

| Sl. No. | Parameter | Relevance | | Level of understanding | | | Trainings Needed | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 0 to 2 | 3 to 5 | Good | Fair | Poor | Yes | No | Relevance | Level of Understanding | Training Required |
| 3.4 | Grievance Redressal System | | 2 | | 2 | | 3 | | Yes | Fair | Yes |
| 4. | FINANCIAL MANAGEMENT | | | | | | | | | | |
| 4.1 | Sources to access funds (details of grants or loans at central, state and local level, details of external funding agencies, institutions, borrowing capacity of Ulbs etc. | 1 | 2 | | 2 | 1 | 1 | 2 | Yes | Fair | No |
| 4.2 | Understanding types of Financial Transfers (Tariff Regulations or Local Revenue Sources, punitive measures, etc.) | 1 | 2 | | 2 | 1 | 1 | 2 | Yes | Fair | No |
| 4.3 | Resource Mobilization | 1 | 2 | | 2 | 1 | 1 | 2 | Yes | Fair | No |
| 4.4 | Various Business Models | 1 | 2 | | 2 | 1 | 1 | 2 | Yes | Fair | No |
| 4.5 | Cost Recovery, Cost Efficiency and Financial Management | 1 | 2 | | 2 | 1 | 2 | 1 | Yes | Fair | Yes |
| 5. | COMMUNITY ENGAGEMENT | | | | | | | | | | |
| 5.1 | Need for Community Engagement, Water Use Efficiency | 2 | 1 | | 2 | 1 | 1 | 2 | No | Fair | No |
| 5.2 | Various Community Engagement Models and Structures | 2 | 1 | | 2 | 1 | 1 | 2 | No | Fair | No |
| 5.3 | Information, Education and Communication (IEC) | 2 | 1 | | 2 | 1 | 1 | 2 | No | Fair | No |

| Sl. No. | Parameter | Relevance | | Level of understanding | | | Trainings Needed | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 0 to 2 | 3 to 5 | Good | Fair | Poor | Yes | No | Relevance | Level of Understanding | Training Required |
| 6. | PROJECT MANAGEMENT AND PRIVATE SECTOR PARTNERSHIP | | | | | | | | | | |
| 6.1 | Project Planning, Monitoring and Control | | | | | | | | | | |
| 6.1.1 | Preparation of Detailed Project Report (DPR) including | 1 | 2 | | 2 | | 3 | | Yes | Fair | Yes |
| 6.1.2 | Tendering and Procurement | 1 | 2 | | 2 | | 2 | 1 | Yes | Fair | Yes |
| 6.1.3 | Contract Management | | 3 | | 2 | | 2 | 1 | Yes | Fair | Yes |
| 6.1.4 | Technical and Engineering Aspects | | 3 | | 1 | 1 | 2 | 1 | Yes | Poor | Yes |
| 6.1.5 | Administrative and Financial Management ( Cost Recovery, Cost Efficiency) | | 3 | | 1 | 1 | 2 | 1 | Yes | Poor | Yes |
| 6.1.6 | Operation, Maintenance and Monitoring | 1 | 2 | | 2 | | 2 | 1 | Yes | Fair | Yes |
| 6.1.7 | Enforcement and Accountability | 1 | 2 | | 1 | 1 | 2 | 1 | Yes | Poor | Yes |
| 6.1.8 | Project evaluation | | 3 | | 1 | 1 | 2 | 1 | Yes | Poor | Yes |
| 6.1.9 | Human Resource Management | 1 | 2 | | 1 | 1 | 2 | 1 | Yes | Poor | Yes |
| 6.2 | Various Models of PPP | 1 | 2 | | 1 | 1 | 2 | 1 | Yes | Poor | Yes |
| 6.3 | Public Interaction and Complaint Redressal System | 1 | 2 | | 1 | 1 | 2 | 1 | Yes | Poor | Yes |
| 6.4 | Use of ICT, GIS, RS and Technology in management of assets and resources | 1 | 2 | | 1 | 1 | 2 | 1 | Yes | Poor | Yes |

Table 22: Detail Training Needs of Solid Waste Management Sector

| Sl. No. | Parameter | Relevance | | Level of understanding | | | Trainings Needed | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 0 to 2 | 3 to 5 | Good | Fair | Poor | Yes | No | Relevance | Level of Understanding | Training Required |
| 1. | LEGISLATIVE AND INSTITUTIONAL FRAMEWORK | | | | | | | | | | |
| 1.1 | Legislative Framework | | | | | | | | | | |
| 1.1.1 | National Urban Sanitation Policy, 2008 | 1 | 2 | 1 | 1 | 1 | 2 | 1 | Yes | Poor | Yes |
| 1.1.2 | Solid Waste Management rules | | 3 | 3 | | | 3 | | Yes | Good | Yes |
| 1.1.3 | Plastic Waste Management rules | | 3 | 2 | 1 | | 3 | | Yes | Good | Yes |
| 1.1.4 | Construction and Demolition Waste Management rules | | 3 | 2 | 1 | | 2 | 1 | Yes | Good | Yes |
| 1.1.5 | E- Waste Management rules | | 3 | 1 | 2 | | 3 | | Yes | Fair | Yes |
| 1.1.6 | Bio- medical waste Management rules (relevant parts) | | 3 | 1 | 2 | | 3 | | Yes | Fair | Yes |
| 1.1.7 | Prohibition of Employment as Manual Scavengers and Their Rehabilitation Act, 2013 | 1 | 2 | 1 | 1 | 1 | 2 | 1 | Yes | Poor | Yes |
| 1.1.8 | Emergency Response Sanitation unit | | 3 | 2 | 1 | | 3 | | Yes | Good | Yes |
| 1.1.9 | National Safai Karamcharis Finance and Development Corporation (NSKFDC) | | 3 | 2 | 1 | | 3 | | Yes | Good | Yes |
| 1.1.10 | National Rating Scheme for Sanitation (Swachh Survekshan, ODF++, Water Plus) | | 3 | 2 | 1 | | 3 | | Yes | Good | Yes |
| 1.1.11 | State level State SWM Policy and Strategy | | 3 | 1 | 2 | | 3 | | Yes | Fair | Yes |
| 1.1.12 | SWM Bye-Laws | | 3 | 1 | 2 | | 3 | | Yes | Fair | Yes |

| Sl. No. | Parameter | Relevance | | Level of understanding | | | Trainings Needed | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 0 to 2 | 3 to 5 | Good | Fair | Poor | Yes | No | Relevance | Level of Understanding | Training Required |
| **1.2** | **Institutional Framework** | | | | | | | | | | |
| 1.2.1 | Roles and Responsibilities of Government Institutions (State/City/ULB) in solid waste management ex –MOEFCC, MoHUA, SPCB's, CPCB, CPHEOO, NGT etc. | | 3 | 1 | 2 | | 3 | | Yes | Fair | Yes |
| 1.2.2 | Institutional Framework (State level/City Level/ULBs) | | 3 | 1 | 2 | | 3 | | Yes | Fair | Yes |
| **1.3** | **Provisions for SWM in Missions And Schemes** | | | | | | | | | | |
| 1.3.1 | Swachh Bharat Mission, 2014 | | 3 | 2 | 1 | | 3 | | Yes | Good | Yes |
| 1.3.2 | Atal Mission for Rejuvenation and Urban Transformation (AMRUT), 2015 | 2 | 1 | 1 | | 2 | 2 | 1 | No | Poor | Yes |
| 1.3.3 | Smart Cities Mission, 2015 | 2 | 1 | 1 | | 2 | 2 | 1 | No | Poor | Yes |
| 1.3.4 | National Urban Livelihood Mission | 2 | 1 | 1 | | 2 | 2 | 1 | No | Poor | Yes |

| Sl. No. | Parameter | Relevance | | Level of understanding | | | Trainings Needed | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 0 to 2 | 3 to 5 | Good | Fair | Poor | Yes | No | Relevance | Level of Understanding | Training Required |
| 2. | SOLID WASTE VALUE CHAIN MANAGEMENT | | | | | | | | | | |
| 2.1 | Waste Segregation and Collection | | | | | | | | | | |
| 2.1.1 | Types of Waste streams (characteristics, features, etc.) | | 3 | 3 | | | 2 | 1 | Yes | Good | Yes |
| 2.1.2 | Transportation of waste -Technical and Engineering aspects, transfer stations | | 3 | 3 | | | 3 | | Yes | Good | Yes |
| 2.1.3 | Available Technologies (technologies, selection criteria, treatment efficiency, land and infrastructure requirement, capex/ Opex, etc.) | | 3 | 1 | 2 | | 3 | | Yes | Fair | Yes |
| 2.1.4 | Mainstreaming of waste pickers in waste management (Human resource management) | | 3 | 2 | 2 | | 2 | 1 | Yes | Good | Yes |
| 2.1.5 | Use of ICT in Collection and Transportation | | 3 | 1 | 2 | | 3 | | Yes | Fair | Yes |
| 2.2 | Wet Waste Management Technology And Approaches | | | | | | | | | | |
| 2.2.1 | Composting techniques | | 3 | 1 | 2 | | 3 | | Yes | Fair | Yes |
| 2.2.2 | Biomethanation | | 3 | 1 | 2 | | 3 | | Yes | Fair | Yes |

| Sl. No. | Parameter | Relevance | | Level of understanding | | | Trainings Needed | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 0 to 2 | 3 to 5 | Good | Fair | Poor | Yes | No | Relevance | Level of Understanding | Training Required |
| 2.3 | Dry Waste Management Approaches And Technology | | | | | | | | | | |
| 2.3.1 | Material recovery facility | | 3 | 1 | 2 | | 3 | | Yes | Fair | Yes |
| 2.3.2 | Types (Advantages and Disadvantages, Treatment efficiency, land requirement, selection criteria, etc.), Technical and Engineering aspects and Capex, Opex and Revenue aspects | | 3 | 1 | 2 | | 3 | | Yes | Fair | Yes |
| 2.3.3 | Recycling/ Reuse/Recovery technologies | | 3 | | 3 | | 3 | | Yes | Fair | Yes |
| 2.3.4 | Potential Buyers | | 3 | | 3 | | 3 | | Yes | Fair | Yes |
| 2.4 | Selection of Solid Waste Management Technologies | | | | | | | | | | |
| 2.4.1 | (Estimating waste generation volume, existing infrastructure, cost, etc.) (problem in legacy waste quantification) | | 3 | | 3 | | 3 | | Yes | Fair | Yes |
| 2.4.2 | Available SWM technologies (Types, features, treatment efficiency, selection criteria) | | 3 | | 3 | | 3 | | Yes | Fair | Yes |
| 2.4.3 | Technical and engineering aspects of available technologies | | 3 | | 3 | | 3 | | Yes | Fair | Yes |
| 2.5 | Bulk Waste Generators (Bwg) Management | | 3 | | 3 | | 3 | | Yes | Fair | Yes |

| Sl. No. | Parameter | Relevance | | Level of understanding | | | Trainings Needed | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 0 to 2 | 3 to 5 | Good | Fair | Poor | Yes | No | Relevance | Level of Understanding | Training Required |
| 2.6 | Waste Disposal – Sanitary Landfill | | | | | | | | | | |
| 2.6.1 | Planning, Designing and Construction of Secured landfill (Site selection, CAPEX, OPEX) | 1 | 2 | | 2 | 1 | 2 | 1 | Yes | Fair | Yes |
| 2.6.2 | Methods of Land Closure and Capping | 1 | 2 | | 2 | 1 | 2 | 1 | Yes | Fair | Yes |
| 2.6.3 | Planning and Designing Leachate Treatment Facility | 1 | 2 | | 2 | 1 | 2 | 1 | Yes | Fair | Yes |
| 2.7 | Occupational Health and Safety | | 3 | 3 | | | 3 | | Yes | Good | Yes |
| 3. | FINANCIAL MANAGEMENT | | | | | | | | | | |
| 3.1 | Sources to access funds (details of grants or loans at central, state and local level, details of external funding agencies, institutions, borrowing capacity of ULBs etc. | 3 | | | | 3 | 2 | 1 | No | Poor | Yes |
| 3.2 | Various stakeholders from financing point of view | 3 | | | | 3 | 2 | 1 | No | Poor | Yes |
| 3.3 | Understanding types of Financial Transfers (Tariff Regulations or Local Revenue Sources, etc.) | 3 | | | | 3 | 2 | 1 | No | Poor | Yes |
| 3.4 | Resource Mobilization | 3 | | | | 3 | 2 | 1 | No | Poor | Yes |
| 3.5 | Various Business Models | 3 | | | | 3 | 2 | 1 | No | Poor | Yes |
| 3.6 | Cost Recovery, Cost Efficiency and Financial Management | 3 | | | | 3 | 2 | 1 | No | Poor | Yes |

| Sl. No. | Parameter | Relevance | | Level of understanding | | | Trainings Needed | | Relevance | Total | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 0 to 2 | 3 to 5 | Good | Fair | Poor | Yes | No | | Level of Understanding | Training Required |
| 4. | COMMUNITY ENGAGEMENT | | | | | | | | | | |
| 4.1 | Need for Community Engagement | | 3 | 3 | | | 3 | | Yes | Good | Yes |
| 4.2 | Various Community Engagement Models and Structures | | 3 | 3 | | | 3 | | Yes | Good | Yes |
| 4.3 | Information, Education and Communication (IEC) | | 3 | 3 | | | 3 | | Yes | Good | Yes |
| 5. | PROJECT MANAGEMENT AND PRIVATE SECTOR PARTNERSHIP | | | | | | | | | | |
| 5.1 | Project Planning, Monitoring and Control | | | | | | | | | | |
| 5.1.1 | Preparation of Detailed Project Report (DPR) including | 2 | 1 | 1 | 1 | 1 | 1 | 2 | No | Poor | No |
| 5.1.2 | Tendering and Procurement | 3 | | | | 2 | | 3 | No | Poor | No |
| 5.1.3 | Contract Management | 3 | | | | 2 | | 3 | No | Poor | No |
| 5.1.4 | Procuring, Installation and commissioning/ setting up SWM projects | 3 | | | | 2 | | 3 | No | Poor | No |
| 5.1.5 | Technical and Engineering Aspects | 3 | | | | 2 | | 3 | No | Poor | No |
| 5.1.6 | Administrative and Financial Management ( Cost Recovery, Cost Efficiency) | 3 | | | | 2 | | 3 | No | Poor | No |
| 5.1.7 | Operation, Maintenance and Monitoring | 2 | 2 | 1 | 1 | | 2 | 1 | Yes | Poor | Yes |
| 5.1.8 | Enforcement and Accountability | 3 | | | | 2 | | 3 | No | Poor | No |
| 5.1.9 | Project evaluation | 3 | | | | 2 | | 3 | No | Poor | No |
| 5.1.10 | Human Resource Management | 3 | | | | 2 | | 3 | No | Poor | No |

| Sl. No. | Parameter | Relevance | | Level of understanding | | | Trainings Needed | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 0 to 2 | 3 to 5 | Good | Fair | Poor | Yes | No | Relevance | Level of Understanding | Training Required |
| 5.2 | Various Models of PPP | 2 | | | 1 | 1 | | 3 | No | Poor | No |
| 5.3 | Public Interaction and Complaint Redressal System | 1 | 2 | | 1 | 1 | 3 | | Yes | Poor | Yes |
| 5.4 | Use of ICT for management | 2 | 1 | | 1 | 2 | 1 | 2 | No | Poor | No |

Notes:

## Notes:

**National Institute of Urban Affairs**